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The Farm

ARTERLY SPRING 1959 FIFTY CENTS

Livestock Automation - - a Picture Section

"They treat you fine at the Goodyear Sign!"

...ssly designed ...s the high power ...ay's tractors

...ACTION SURE-GRIP WITH "...RQUE CONTROL"

...ers Traction—Action at the Point of Powe...

...*power* has been moving ahead ...*rt years, drawbar pull has* ...*0%!*

...this power-surge "torque"—...ing extra *twist* delivered to

...-GRIP IS BUILT TO HANDLE ...rns *twisting action* into trac-...y it's on the newest, most ...s.

...XCLUSIVE 3-T Cord, triple-...*iple-tough*—and built stronger ...ACTION SURE-GRIP stands off buckling, buckle breaks, cracking and rim slippage—withstands today's higher-powered wallops of rocks and snags and the extra strains at lug *bases*.

COMBINED WITH GOODYEAR'S WORLD-FAMED TREAD DESIGN, *ruler-straight* lugs and "*Wedge-In*" action – you have the tire that makes the most of the power engineered into your high-torque tractor.

See the TRACTION SURE-GRIP with "Torque Control" on the very latest farm tractors—or call your nearest Goodyear dealer. Goodyear, Farm Tire Dept., Akron 16, Ohio.

For unexcelled front tire performance:

NEW SUPER-RIB

3 ribs for better steering, better flotation, better wear!

...S BY

...OODYEAR

Sure-Grip–T.M. The Goodyear Tire & Rubber Company, Akron.

MORE FARMERS PREFER GOODYEAR TRACTOR TIRES THAN ANY OTHER KIND!

...r Monday evening

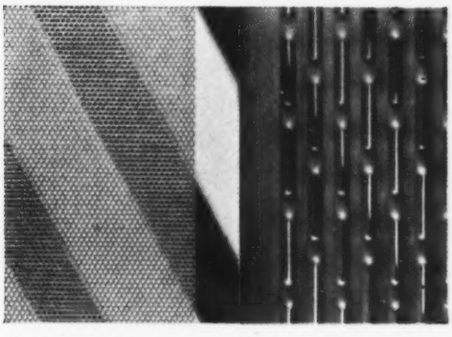
MAR 11 1959

NEW HEATER can be adjusted for crops ranging from corn and milo to small grains. It can also be readily adjusted for drying in sub-freezing weather.

1959 BUTLER STOR-N-DRY® *SYSTEM*

Now better than ever, this year's Butler Stor-N-Dry® System makes on-farm storage and drying more practical and profitable than ever! A new heater, for example, cuts fuel consumption and gives better heat distribution for drying in cold and wet weather. It can be adjusted right on the farm—in minutes—to exactly fit different crop and drying conditions. Saves buying extra equipment as your farming methods change.

Safety and operating convenience are built in. You just fill the bin, push the fan button and, if weather or wet grain makes heat necessary, start the heater. An optional humidistat turns the heater on and off as the weather changes. Heat and air are properly balanced to prevent over-drying and parched grain. No complicated filling tables, no ducts to interfere with unloading.



YOU CAN SEE THE DIFFERENCE IN PERFORATED FLOORS. Butler floor (left) is 25% open, clearly shows red stripes underneath. There are so few holes in other manufacturer's floor (right) you can hardly see stripes. This means air flows through Butler floor easier, makes drying more uniform and quicker with less fan power.

ALL IN A "PACKAGE." Grain bin, perforated floor with built-in steel supports, fan and optional heater are designed by Butler grain storage experts to work as a system. For a demonstration, consult the Butler Blue Ribbon dealer nearest you, or write for catalog.

BUTLER MANUFACTURING COMPANY

BUTLER STEEL PRODUCTS

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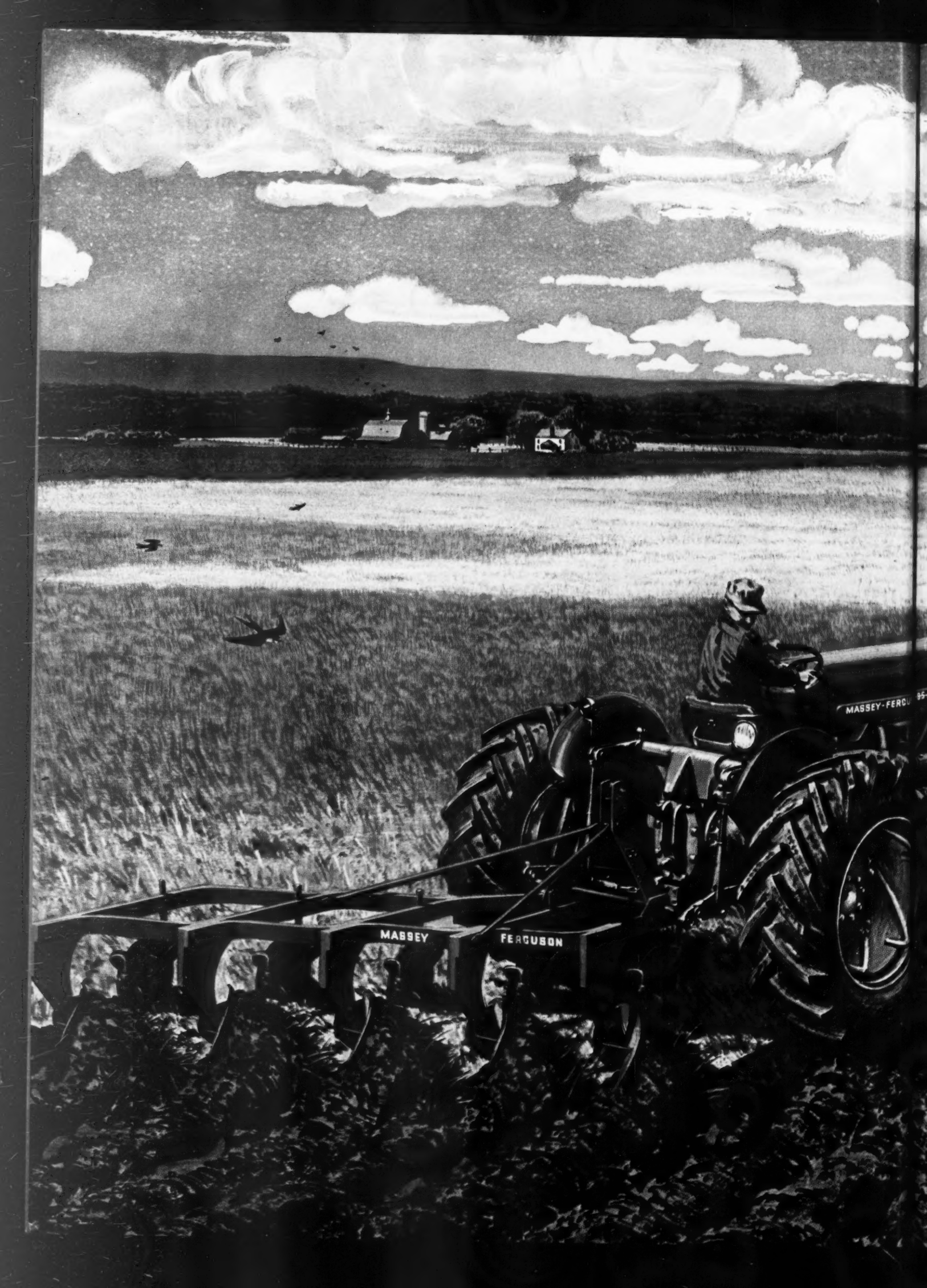

MASSEY
FERGUSON

Look, compare...you'll be a Massey-Ferguson man

CUTTING WIDE OPEN SPACES "DOWN TO SIZE!"

All-new Massey-Ferguson 85 harnesses big 5-plow power as never before!

Out where the fields stretch away to the horizon, a great new tractor is making news.

It's the all-new Massey-Ferguson 85, the first Ferguson System tractor in the "60 horse" class. And it introduces a whole new concept of big-acreage farming.

This is the *big* tractor big-acreage farmers have been asking for. It has power to spare to work the new fully mounted 5-bottom Massey-Ferguson safety-beam plow. And it puts its surging power to work as no other tractor can, with its specially engineered Ferguson System of precise implement and draft control.

What makes the MF 85 the ideal big tractor is its versatility. It combines the power needed for biggest jobs with a new kind of precision implement control for row-crop farming. It handles more *fully mounted* implements than any other tractor in its power class . . . with far greater mobility, maneuverability, and control of implements than is possible with semi-mounted or pull-type tools. For more about the great new MF 85, turn the page.

"WOW! A FERGUSON SYSTEM TRACTOR IN THE 60 HORSE CLASS!"

It's the all-new Massey-Ferguson 85

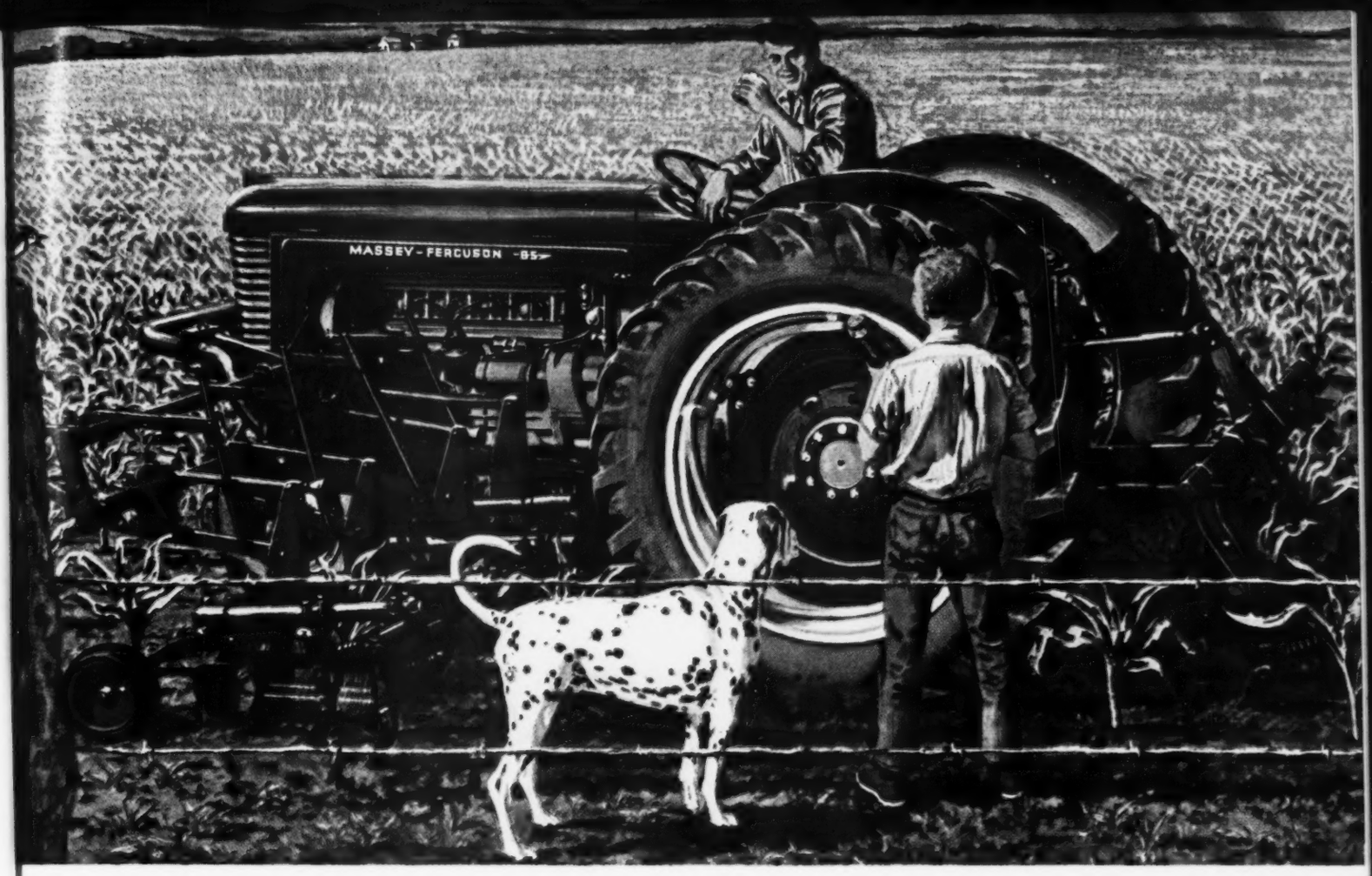
That's the big, 13-tine MF 126 Field Tiller the new MF 85 is working, 12 inches deep in hard, compacted soil. And any Corn Belt farmer knows that this increasingly popular way of breaking the plow sole calls for plenty of power!

The MF 85 *has* that power. And, with its fully mounted tools like the MF 126 Tiller here, that power is at your complete command through the MF 85's specially engineered Ferguson System. Fully mounted tools become *part* of the MF 85; the operator has instant, finger-tip control of raising, lowering, precise implement depth. With the MF 85's 3-point hitch with interchangeable ball sockets, *all* fully mounted Massey-Ferguson field tools, large and small (and other 3-point hitch tools too), virtually become "self-propelled"!

New Western Model too... the MF 88 Western, for use where 5-plow lugging power is needed to pull big drawbar-type implements. Big traction tread tires and crown fenders. The MF 88 Western is fitted with a hydraulic system specially designed for controlling up to three separate remote cylinders for pull-behind machines.

New ease of transport for biggest tools. With just a touch of your finger, you raise the MF 85's fully mounted tools (new 40-disc size MF 68 tandem disc harrow, below) to transport position, and you travel far faster, easier, more safely than with semi-mounted or pull-type implements. You can back into corners, maneuver into cramped spaces to drop tools for storage, as easily as parking your car!

That's 1300 lbs. of plow hanging there, its entire weight carried by the tractor. Yet its rear share is cutting a marker furrow 3 inches deep! This can actually be done with the MF 85 and its fully mounted 5-furrow plow; it proves the precise control that only the Ferguson System provides. Set the plow for any depth; the Ferguson System's controls keep it where you want it.



THE NEW MF 85 BRINGS A NEW KIND OF BIG POWER TO CORN BELT FARMING!

It used to be that a tractor in the "60 horse" class was strictly a lugger, or worked semi-mounted tools at best. The new MF 85 changes all that.

It brings to big-acreage farms all the advantages formerly available only in smaller Ferguson System tractors . . . *plus* 5-plow work capacity to get jobs done faster and more economically.

When the task calls for it, the MF 85 will lug right along with much heavier, clumsier tractors. Yet on lighter jobs, the MF 85 wastes no fuel on excessive tractor weight.

But what good Corn Belt farmers like to see is the precision-work kind of plowing and row-crop cultivating the MF 85 delivers. No other big tractor can equal it, because no other has the world-famous Ferguson System of precise draft and implement control.

The MF 85 is the tractor you *must* see, and soon!

Handles easily as a light tractor! For all its big, big power, the MF 85 handles so easily, it's almost like driving a car. Arm-saving Power Steering is standard equipment. Actually, even with heavy equipment mounted, the MF 85 handles more easily than many lighter, less powerful tractors *without* equipment! You get up on it in one easy step, too; no crawling up from the rear.

Now it's ***MASSEY FERGUSON***

Massey-Ferguson Inc., Racine, Wisconsin

Pace-Setter of Modern Farming . . .
World's Most Famous Combines and the
Only Tractors with the Ferguson System

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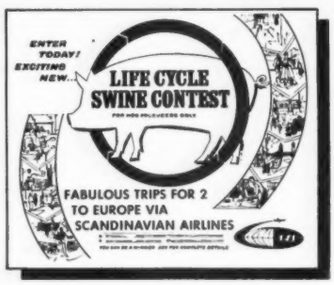
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FOR HOG PRODUCERS ONLY
FABULOUS TRIPS FOR 2 TO EUROPE VIA SCANDINAVIAN AIRLINES

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Put yourself in this picture. Fly to Europe via luxurious Scandinavian Airlines System. See the Old-World charm of 4 foreign countries. Compare European farming with your own.

Never before an opportunity like this! You'll fly, via luxurious SAS Scandinavian Airlines System to England, France, Germany, Denmark. You'll travel as an Ambassador of American Agriculture . . . be greeted by Agricultural attachés . . . meet ministers of agriculture . . . tour leading farm operations . . . see agricultural research centers.

HERE'S HOW TO WIN

Prizes will be awarded strictly on merit. Size of your operation isn't important. It takes good management and feeding to win.

Grand prize winners of the European trips will be selected by a committee of swine experts from the National Swine Growers Council, the USDA and leading land grant colleges.

See your favorite feed supplier for complete details. Enter today.

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Brooklyn 6, N.Y.
Science for the world's well-being.

HOW LIFE CYCLE FEEDING HELPS INCREASE PROFITS FROM SWINE

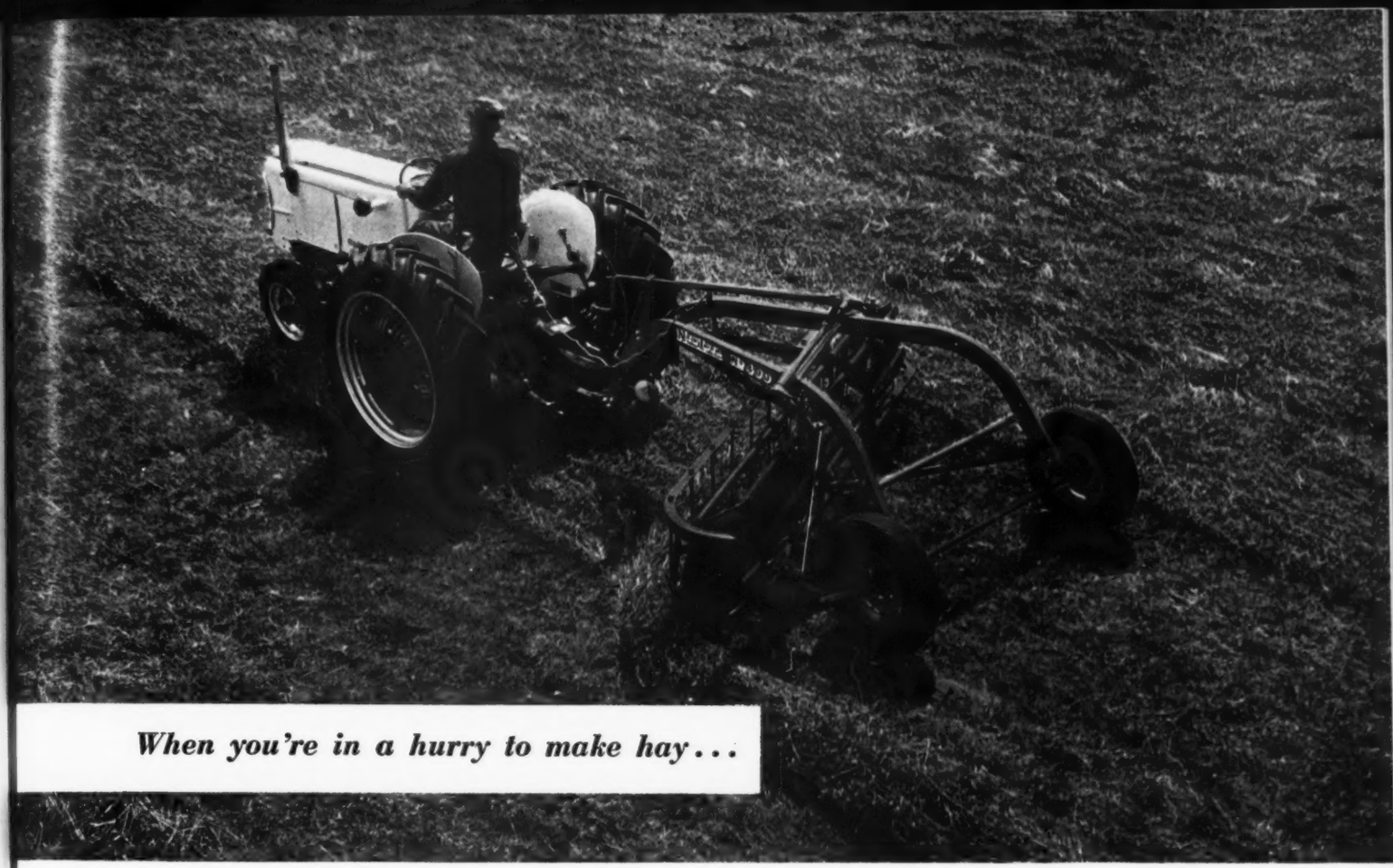
Life Cycle Feeding satisfies the nutritional needs of hogs during each phase of their growth. Litters are larger, healthier, and huskier. Pigs start out right. They continue this advantage all the way to market. Feed efficiency is greater; gains, faster; costs, less. You market more pounds of pork per litter.

Colleges, USDA, and the feed industry all show that with Life Cycle Feeding you come out ahead even if hog prices drop.

Today, feed manufacturers are formulating feeds balanced according to Life Cycle needs. Terramycin is added to give greater feed efficiency, faster gains and lower feed costs. Terramycin promotes better health, produces fewer runts.

Your feed dealer will be glad to give you complete information on Life Cycle Feeds with Terramycin. See him soon—and you may win a trip to Europe!

Pfizer



When you're in a hurry to make hay...

FITS ANY TRACTOR — NEW OR OLD

NEW IDEA Pull Type Rake Saves You Time 6 Ways!

1. It's pull type. Hitch this NEW IDEA rake to any tractor draw bar with one pin and you're ready to go.

2. It's a parallel bar rake. Moves hay only half the forward distance of conventional side rakes. Cuts raking time in half.

3. One easy-to-reach crank controls transport lift and raking height adjustment. Exclusive as standard equipment with this NEW IDEA pull type rake.

4. Sealed, grease-filled gear box for once-a-season lubrication. NEW IDEA rake has only two daily lubrication points.

5. Tractor-seat clutch control. Pull rope once to engage clutch. Pull again to disengage. Clutch is spring loaded to out-of-gear position for transport safety.

6. Transport speeds up to 20 m.p.h. Trails true in field or on highway. Short-coupled, trailer type construction also makes this NEW IDEA rake easy to turn, handle, and back up.

...and it does the cleanest raking job you ever saw

NEW IDEA pull type parallel bar rake handles hay gently ... reduces leaf shattering ... makes uniform, fluffy, free-breathing windrows. Lifts and rolls hay instead of tumbling it. The fixed relation between ground speed and reel speed assures gentler raking action at all speeds. Does the cleanest raking job you ever saw.

Full 8-foot width let you rake 7-foot swath onto fresh stubble at speeds up to 8 m.p.h. Basket tilts to vary fluffiness of the windrow. Like all NEW IDEA equipment, this NEW IDEA pull type rake is built to give you years of trouble-free service. Also available as a mounted PTO-driven rake.

See this time-saving, crop-saving NEW IDEA rake at your NEW IDEA dealer's, or mail coupon below for free literature *today*.

OUR 60th YEAR NEW IDEA

NEW IDEA
FARM EQUIPMENT CO.
DIVISION Avco DISTRIBUTING CORP.
Dept. 25, Coldwater, Ohio

Please send free literature checked:

- ☐ Pull type parallel bar rake
- ☐ Mounted parallel bar rake
- ☐ Pull type rakes and tedders
- ☐ Semi-mounted mower
- ☐ Full trailing mower
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- ☐ Booklet "Tried and New Ideas for Making Hay"

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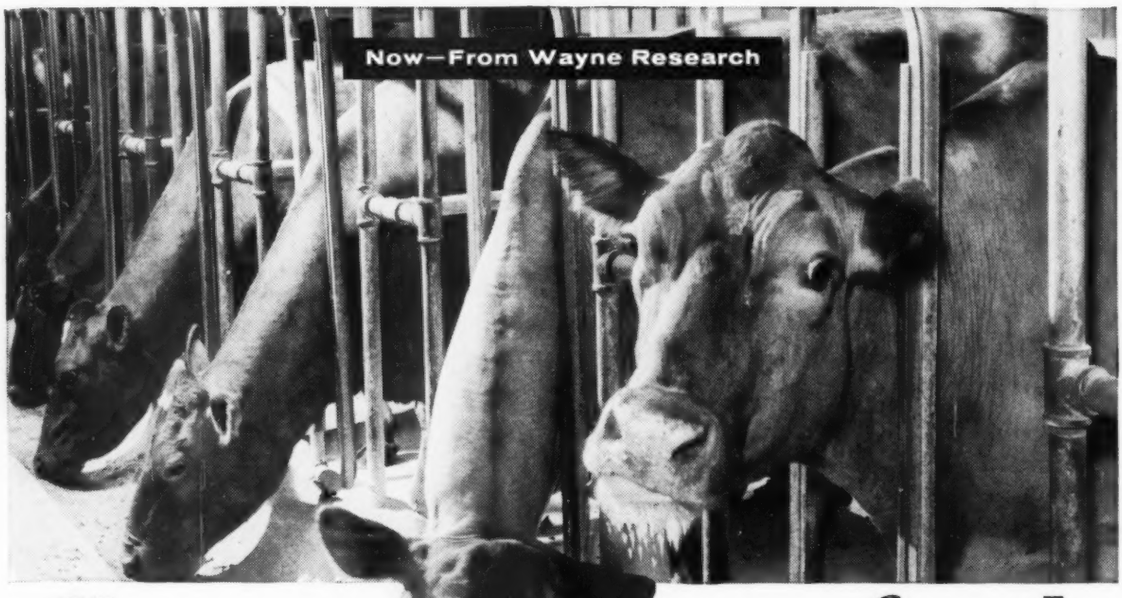
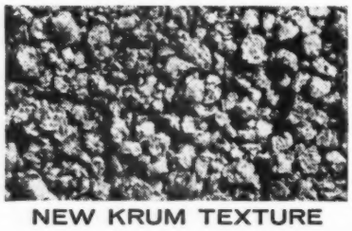
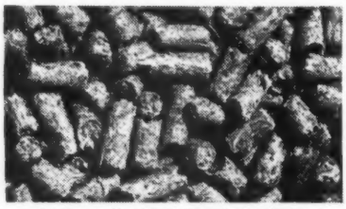


all-new dairy feeds

NEW COARSE TEXTURE



NEW KRUM TEXTURE



NEW "MP" PELLETS

NEW TASTE SMELL LOOK FORM

New WAYNE Coarse-Textured Process Improves Palatability, Appearance and Handling.

Now from Wayne comes five new dairy feeds, in three coarse textured forms, designed to meet the new requirements of Dairymen!

Developed by Wayne Research, these new Dairy Feeds provide top nutrition and feeding efficiency plus improved palatability, and appearance. The new texture is ideal for bulk handling and automatic feeding, too. These feeds offer all the benefits you've been wanting . . . ask for details today!

WAYNE 32 DAIRY KRUMS
WAYNE TEST COW
WAYNE "MP" DAIRY PELLETS
WAYNE SUCRENE 16 DAIRY
WAYNE FITTING AND PRODUCTION RATION

Other Wayne Dairy Feeds available for mixing and special needs

WAYNE FEEDS

MEET THE NEW REQUIREMENTS OF DAIRYMEN

Allied Mills, Inc.

Builder of Tomorrow's Feeds . . . Today!

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RIDGID

"Of Course, I said RIDGID... It's the only pipe wrench for my money. I've got work to do!"

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The Ridge Tool Company
Elyria, Ohio, U.S.A.

The Farm QUARTERLY

Spring, 1959, Volume 14, No. 1

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THE FARM QUARTERLY
22 East Twelfth Street, Cincinnati 10, Ohio

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Lloyd Briesch (right) checks tire condition with his Cheyenne Firestone representative, W. E. Tewksbury.

"FIRESTONE REALLY BUILDS A TIRE FOR ROUGH GOING!"

says Lloyd Briesch, the Wyoming Hereford Ranch, Laramie County, Wyoming. "I've never seen a tire that beats a Firestone at ranching. We've found that original equipment Firestones last nearly as long as the equipment—that's about the best tire service a man can get! And Firestone traction is plain good. I can't remember when one of our tractors was ever hung up."

Farmers all over the country have found Firestone Farm Tires are specially built for longer field and road wear. Tough tractor tire tests prove Firestone's new All Traction Champion*, with Firestone S/F (Shock-Fortified) cord, gives you higher impact resistance for longer tire life. Curved and tapered tread bars, built with exclusive Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires, give you sure-footed pull-power in even the worst soil conditions—yet clean out easily. And a special Firestone Rubber-X compound is used in the sidewalls to resist aging, cracking and costly flex damage.

See your Firestone Dealer or Store and find out how Firestone S/F cord and Firestone Rubber-X give you extra service at no extra cost! See the great new All Traction Champion, as well as Firestone's complete line of farm tires. And ask about Firestone's Free New Tire Loaner Service that keeps equipment rolling while your old tires are retreaded or repaired.

CHAMPION GUIDE GRIP*
FRONT TRACTOR TIRES
give you easier steering
better cleaning • longer wear

*FIRESTONE T.M.

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1959, The Firestone Tire & Rubber Company

Enjoy the Voice of Firestone on ABC television every Monday evening.

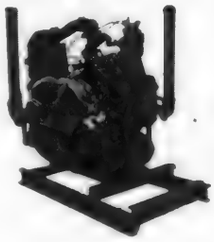
Gravity or sprinklers...Cut '59 water costs with pump-matched International power!

GASOLINE. Fourteen models from 16 hp. to 222 hp. UC-60 with 16 hp. @ 2500 rpm. is illustrated.

LP GAS. Eleven models from 28 hp. to 215 hp. U-264-6 with 81 hp. @ 2400 rpm. is shown.

NATURAL GAS. Fourteen models from 10.5 hp. to 248 hp. UV-549 with 192 hp. @ 2600 rpm. is illustrated.

DIESEL. Seven models from 60 hp. to 265 hp. UDT-1091 Turbotorque® with 265 hp. @ 1500 rpm. shown.



Act now whether you irrigate by gravity or sprinklers—and you can: 1) cut this year's pumping costs; and 2) power your irrigation system more dependably. It's as simple as replacing costly, unreliable engines with dependable Internationals. These are the pump-matched irrigation engines that pump for less by getting top production from high speed pumps and low cost fuel.

You'll find International power meets all your irrigation needs. This famous line now includes 21 carbureted and diesel models, ranging from 10.5 to 265 horsepower. And it's reassuring to know that since 1903 farmers have purchased more Internationals than any other heavy-duty engine. This long-established preference is based on one fact: Internationals make more money for owners.

For a real deal on irrigation power that will cut your pumping costs, visit your nearby International Power Unit Distributor or Dealer. Get his price on the International matched to your pump. See how you can buy the engine with factory tested fuel equipment of your choice for a full measure of power with minimum fuel consumption. Check International heavy-duty features that make these engines least expensive to own and operate. Inspect the parts and service support that backs International owners in any emergency.

INTERNATIONAL® HARVESTER

180 North Michigan Avenue • Chicago 1, Illinois

***International Harvester Products pay for themselves in use*—Farm Tractors and Equipment... Twine... Commercial Wheel Tractors... Motor Trucks ... Construction Equipment—General Office, Chicago 1, Illinois.**

DOUBLE-UP: D6 (75 DBHP) pulls 29′ field cultivator and 6 section drag to work 180 acres per day. D4 (50 DBHP) pulls 40′ of drag, working 320 acres per day.

DOUBLE UP this spring

and save time and money!

Racing down the field with a light load may make you feel like you're doing a lot—but you'll find you will accomplish more, make equipment work better and last longer when you load your tractor to a maximum and operate it at the proper speed. Here are some examples of Cat Diesel Tractors working at near-capacity.

DOUBLE-UP: Each D4 here pulls about TWICE the load pulled by ordinary tractors: 30′ tandem disk with 30′ drag, or 2–14′ press drills, to work 140 acres per 10 hour day.

DOUBLE-UP: D4 pulls 7–14s plowing clay loam 7″ deep to work 30 acres per day.

To pull loads like these and keep it up year in, year out, you've got to have abundant traction backed by plenty of stamina and lugging power. And only Caterpillar track-type Tractors have everything it takes: Full diesel engine—not a hybrid gas conversion • Full length wet-type sleeves • Aluminum alloy main and rod bearings • Individually replaceable injector valves that never require balancing • Exclusive Cat oil clutch that outlasts ordinary clutches 5 to 1.

You can have all these advantages this spring—just see your Caterpillar Dealer—today! Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR

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TEST YOUR SOIL FREE

Make More Money—Double Your Yield per Acre

Get up to 200 Bu. Corn per acre • 100 Bu. Wheat 30 Tons Tomatoes • 750 Bu. Potatoes 5 Tons Hay • Up to 300% Increase in Milk

NOW is the time to get the facts — farm management experts, agronomists, ag college leaders, editors agree this is the year to make more money with bigger yields. Using fertilizer correctly with a Sudbury Soil Test Kit, most farms can double their yield.

Make Every $1 Bring Back $10.00 or More

You'll get back up to $15.00 in extra yield for every dollar spent on fertilizer, harvest bigger crops, yet at the same time build up your soil for even heavier yields in years to come. Every year the suburbs grab up more acres, the population is growing, food demand expanding — America will need every bushel you can grow from every acre you own!

YOU'LL ALSO SAVE MONEY ON FERTILIZER

Guessing about fertilizer is foolhardy. You waste money when you use too much, and the wrong kind can do more harm than good! And you have to take heavy losses when you don't use enough. An Illinois farmer guessed he needed 235 tons of limestone but soil tests showed he didn't. That saved $500 for phosphate he did need. Your Soil Test Kit will repay many times its cost even the first month. You'll use it all your life! You'll be as pleased as the Ohio farmer who boosted corn yield 300%, oats 500%, wheat 100%, hay 300%.

Farmers deLuxe Soil Test Kit

So simple anyone can use it! So reliable that county agents, ag. colleges, extension workers and progressive farmers everywhere depend on it. Complete with everything for hundreds of tests. More valuable than all your stock and tools! Shows right amounts of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle. Easy instructions show needs of 225 different crops. Ready to use anywhere, anytime, even out in the field. No delays waiting for reports — the answer is printed right on the chart. Stop guessing — order today. **Big Value, only $29.95.**

No Knowledge of Chemistry Needed

EASY AS READING A THERMOMETER

Even your first tests will be accurate and reliable. Takes only 10 minutes, costs less than 10c a test! The Dept. of Agriculture approves of Soil Test Kits for farmers. It's not only profitable—it's fascinating and fun to "do it yourself."

You Can Be Wrong — Soil Tests Never Are!

The right fertilizer, guided by soil tests produced the bumper corn yield in the bin at right, above.

These wheat tests by a leading ag. college show yield increased ten-fold with proper fertilizer. See the vigorous root system as well as heavy top growth of plant at right. Even when only phosphate or potash was lacking, yield dropped as much as 40%.

Better Crops Guarantee

You take no risk — even next fall if you didn't have bigger, better crops after using your Soil Test Kit this spring and summer, send it back and we'll return your money — our Daring Guarantee!

SEND NO MONEY — Just mark coupon and we'll mail C.O.D. plus postage. Or send check and we'll pay postage saving you from $1.91 to $3.55 in postal charges.

Money-Back Guarantee

FREE BOOK — If you send check, we'll also include a valuable book on farm management, "Our Land and Its Care."

FREE TRIAL

Make several tests yourself; if not delighted, return in 10 days for full refund and your tests cost you nothing!

CUT OUT AND MAIL TODAY

500,000 Users Can't Be Wrong!

S.H. of Michigan "guessed" his potato field had enough potash but needed nitrogen. Tests showed he was wrong. He used potash and doubled his yield!

R.S.G. of Indiana tested his soil and has reduced fertilizer costs by using only what his Sudbury Soil Test Kit showed was needed.

A.D. of Indiana nearly doubled his corn yield after testing his soil.

A.F.B. of Iowa increased his bean yield 50% by correcting phosphate and potash deficiencies his Sudbury Soil Test Kit revealed.

W.L.D. of Pennsylvania saved $400 on fertilizer. "The Kit has paid for itself over and over again."

G.H., Ohio "Have made many tests; like its simplicity and accuracy. Worth 1000 times its cost on my 320 acres."

Dealers: Write for Special Offer

SUDBURY LABORATORY, Box 51N, Sudbury, Mass.

World's largest makers of Soil Test Kits

SUDBURY LABORATORY, Box 51N, Sudbury, Mass.

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free book, "Our Land and Its Care."

☐ Send C.O.D. plus postage.

Name .....

R.D. or St. .....

P.O. ..... Zone ..... State .....

☐ Send on Easy-Payment Plan — I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.

NEW

light-weight...power-packed

AIR-COOLED DIESELS

for economical farm power

Jlo* Series 365
7 horsepower

Jlo Series 660
12 horsepower

(pronounced "ee-lo")

There's a growing demand for the dependability, economy and safety of diesel engine power for farm applications. Now, for the first time, Hercules offers you the benefits of low-cost, maintenance-free, air-cooled diesel power for applications below 15 horsepower.

Look at the features this new Jlo Series line, available only through Hercules nationwide distributor network, offers:

SIMPLICITY: Jlo Series diesels are of the 2-cycle design, proved practical in their power range. That means there are no valves, tappets, push-rods or camshaft in Jlo engines to require maintenance or adjustment.

EASY TO OPERATE: Jlo Series diesels start fast in all weather; run smoothly too, even under tough, intermittent-load service.

ECONOMY: Low initial cost is coupled with lower maintenance costs, due to the Jlo engine's simple, dependable design. And you save on fuel, too.

PERFORMANCE-PROVED: These West-German built diesels have been successfully used the world over . . . now are available in the U. S. through Hercules, known for dependability and service.

LIGHT WEIGHT: These powerful engines deliver 7 and 12 horsepower yet weigh only 110 and 190 lbs., respectively; add less dead-weight to equipment and save on foundations in stationary applications.

H HERCULES

HERCULES ENGINES... Sold and Serviced the World Over

SEND FOR A BOOKLET ON THESE COMPLETELY NEW ENGINES!

HERE'S WHERE JLO SERIES ENGINES CAN SERVE YOU:

auxiliary generators . balers combines . corn pickers . conveyors . crop dryers . fans . grain elevators . harvesters . hoists irrigation pumps . silage blowers sprayers . spreaders . swathers tractors... and other farm jobs.

*Reg. TM JLO-Werke, G.m.b.H., Pinneberg, Germany

Hercules Motor Corporation
Department 32C, Canton 2, Ohio

Yes, I'd like more information on Jlo Series Diesels for this application.....

Name_____

Address_____

City_____State_____

Trefoil Reconsidered

Sirs:

I was pleased to see the article on Birdsfoot Trefoil. However, I wondered if the folks interviewed knew that they would be quoted or, were they speaking carelessly off the cuff?

The author states that trefoil is a crop without truly pure strains or varieties and says that a farmer may buy exactly the same type of seed at different times and get different performance from it. This is true only of imported or European type of trefoil. I, personally, know it is not true of Empire, Viking and Mansfield varieties because they are grown here in the Champlain Valley. Certified seed of these varieties is produced under rigid specifications.

All grades of certified seed are grown in fields which are inspected each year by an Inspector from the New York State Seed Growers Association who checks the field not only for weeds and other crop plants but also for trueness to type of trefoil. Off-type plants would throw this field out of certification.

The author quotes Professor Rod Briggs, of Minnesota, to the effect that on trefoil there has been no research. This is incorrect. It is true there has been much more research on an alfalfa plant which has been used for many more years. Trefoil has only been recently introduced but New York, Vermont, Pennsylvania, Iowa, and Indiana have done a tremendous amount of work with it.

As I said, I am glad to see your magazine take a continuous interest in trefoil and give it the space you have but I was disappointed in some of the information in it.

Ray Bender
County Agricultural Agent
Westport, New York

The article was checked by everyone quoted and by several experts. Professor Briggs said of trefoil research, "nothing compared to the other legumes."

The Gentle Art

Sirs:

I've just finished reading "Bundling, The Gentle Art or Matrimony Encouraged."

The writer makes mention of a sleeping arrangement between Boaz and Naomi. The illustration should refer to Boaz and Ruth, who slept at Boaz' feet one night (Ruth, Chapter 3).

(Mrs.) Ruth J. Loveland
Ithaca, New York

Little Dams to the Rescue

Sirs:

The disastrous January floods in this and other Midwest states caused me to reread the article, "Little Dams Stop Big Floods." Surely, this is the answer to the problem along the smaller streams. We saw millions of dollars of damage right in this county caused by streams which ordinarily wouldn't float a canoe. Indian Creek, behind our house, invaded our basement and ruined our furnace, our deep freeze. Then tore up the roads, washed out fences, ripped buildings from their foundations and scoured bottom lands.

Big dams down stream would not have helped a bit. But small up-stream reservoirs, as described in your article, could have saved the day.

Neil Murphy
Hamilton, Ohio

Your Doctor of Motors says...

"TRY THESE PROFESSIONAL TIPS ON ENGINE BREAK-IN!"

To keep performance high and repair bills low, you're always wise to follow modern break-in procedures. This will assure adequate lubrication of pistons, cylinder walls, bearings and other moving parts and prevent excessive initial wear.

So whether you're sporting a new tractor, truck or car, or have overhauled the old one, you'll be time and money ahead if you follow a few professional tips on engine break-in:

1. Avoid the out-dated method of breaking-in by idling for long periods. Cold water running through the block at idling speeds keeps the cylinders contracted while the pistons are expanding—causes pistons and cylinder walls to scuff and score.

2. Make the first job one where you can vary the engine speed frequently for the first 2 or 3 hours. Acceleration loads the rings sufficiently for quick mating of cylinder and ring surfaces. Deceleration causes a high vacuum to form in the cylinders so that oil is drawn into the upper cylinder area to cool and lubricate both cylinder and rings. Also, changing engine speeds lets the coolant reduce the temperature of any hot areas before damage takes place.

3. Make sure the weight of oil is what the manufacturer recommends. Watch oil pressure and temperature gauges closely during the first few hours—and be sure the filter is clean.

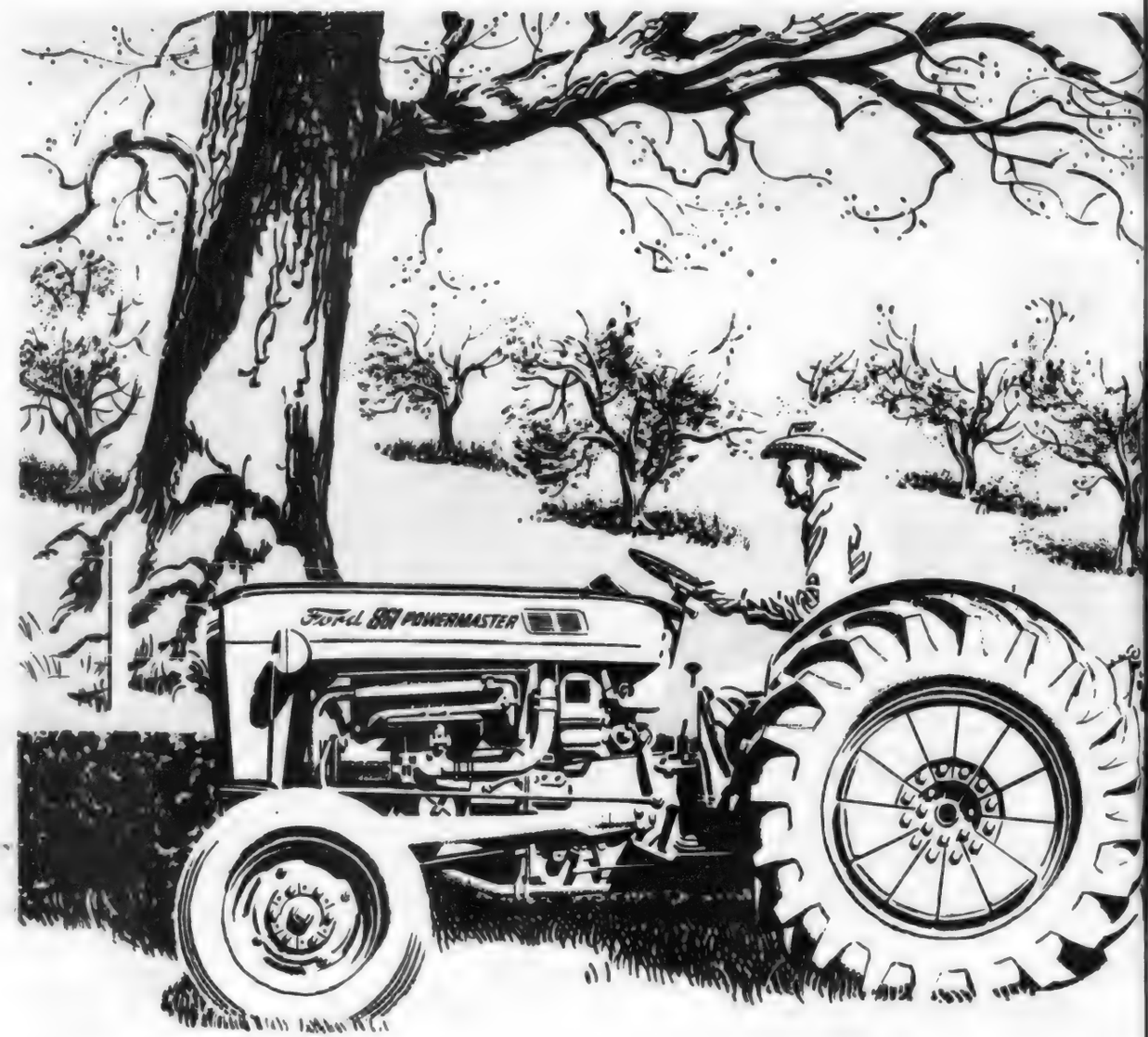
4. Change engine oil and oil filter after the first 10 hours (or 500 miles). This removes particles of metal which come loose from new surfaces being worn-in.

5. Avoid low engine speeds under full power. This lugging causes overheating through too much fuel charge, inadequate oil and water circulation. This can damage piston and cylinder walls, wrist-pins, rod bearings, even the transmission and differential.

Next to engine care and protection, nothing adds more to engine life than Perfect Circle 2-in-1 Chrome piston ring sets. PC *solid* chrome plating resists scuffing and scoring, provides 200 extra degrees of temperature safety margin, doubles the wear-life of pistons, cylinder walls and rings!

PERFECT CIRCLE

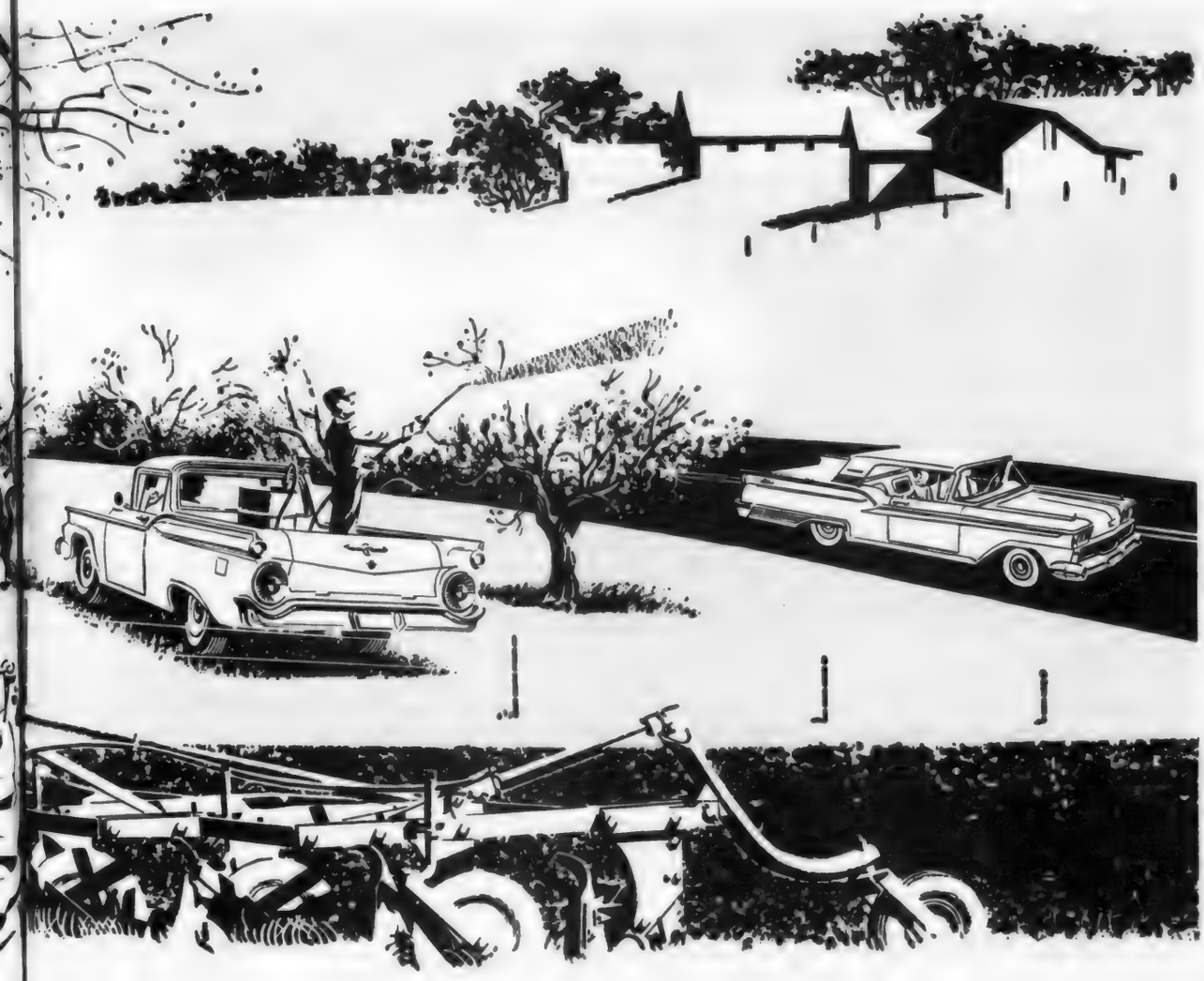
Hagerstown, Indiana Don Mills, Ontario, Canada



Ford 861 Powermaster tractor with 4-bottom plow; Ford Ranchero pickup; and Ford Galaxie 2-door hardtop.

the Ford Farm Family...

Lightens your load— brightens your leisure



You'll find this rugged Ford Powermaster tractor delivers far more power per dollar than any other 3—4 plow tractor available today. And Ford high compression, low friction engines add savings in fuel and repairs. Compare Ford's comfort and convenience features, too: easy step-up to the seat from either side—handy hydraulic controls. See why you can farm more with less work on a Ford Powermaster.

Look now at that Ford Ranchero—all the load capacity and utility of a pickup, all the spacious comfort and convenience of a passenger car at a modest investment. Notice, too, the beautiful, Thunderbird-inspired Ford Galaxie, newest concept of fine-car style and luxury in the low-priced field. In cars, trucks, tractors and farm implements, your investment buys more in the Ford Farm Family.

FORD MOTOR COMPANY THE AMERICAN ROAD, DEARBORN, MICHIGAN

TRUCKS • TRACTORS • IMPLEMENTS • CARS • INDUSTRIAL ENGINES

Alone...but not for long

WHEN you have important decisions to make and don't know who can give you the right advice, you're alone.

You'll *always* have good company, though, when you have the Doane Agricultural Digest.

Want to know when to sell cattle nearing market weight? Just turn to "When to Sell & Buy." Can't get accurate information on new equipment? Read the latest "Farm Machinery Developments."

Thinking of making a big change in your farm or ranch operation? Better consult Doane's long-range outlook reports first.

Reach for the Digest whenever you have a question on marketing, production, management . . . taxes, credit . . . fertilizers—just about everything that goes into your income or expense.

WHAT'S BEHIND THE DIGEST?

There's 40 years of Farm Management experience. This means grassroots application of sound ideas designed to boost your income. Doane's veteran Farm Management team (a coast-to-coast staff) must deliver profits to the farm owners they work for . . . or else. (They deliver!)

There's Doane Research. This group collects valuable data from farm families on the equipment, feeds, fertilizers they use. Doane researchers conduct field tests to check performance, too.

There's also the strong alliance of Doane Authorized Builders. These specialists (and maybe there's one in your community) construct the money-saving, chore-cutting buildings that make "DOANE-DESIGNED" a sign of progress.

See why the Digest can be of immense value to you?

Free information will be sent to you on the Doane Agricultural Digest, Doane Farm Management, Doane Research or Doane-Designed Farm Buildings. Feel free to outline your farming interests and problems, in detail if you wish. Doane can probably be of immediate help to you.

DOANE AGRICULTURAL SERVICE, INC.

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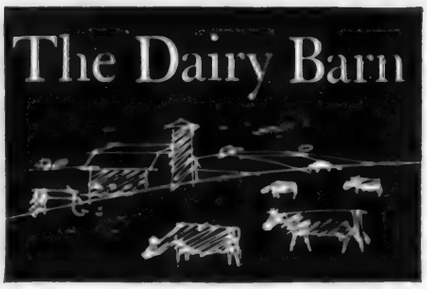


Protein Test? Dairymen who have been setting up even a low-voiced holler about the fat test method of pricing milk will be interested in new ideas for putting a value on the product.

The industry has long been hearing of the disadvantages of the fat test, and there is some doubt if high-fat milk is what the consumer wants. So a new protein test for milk, developed by the University of Wisconsin, is doubly important. The test is simple, fast and cheap, and is being tested for consistent accuracy by the inventor, R. M. Bock. Accurately measured amounts of milk and a dye are mixed, and centrifuged. The color of the mixture varies with the protein content of the milk, and can be compared to standard colors in a machine.

The test may speed the day when milk is bought for protein and "solids not fat." And some dairymen would not be able to complain of the fat sample bottle going sour on the dairy shelf for a couple of weeks before testing.

Udder Supports There are only a few cow-bras on the market, but the problem of the broken or pendulous udder is being well studied from the inside.

There are seven supports for the udder, including the skin and several ligaments and suspensory tissues. Researchers in the USDA have been showing what happens when one or several of these supports weaken or break down. They can lead to several types of pendulous udder. When the center ligament fails, the teats point outward, and in some cases are above the floor of the udder. Similarly, if the outside fastenings are weak, the teats point inward.

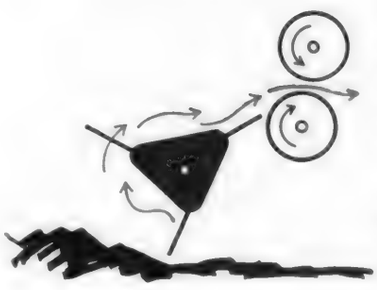
If the outside suspendors fail, the udder can drop slightly, so the bag hangs like a pot-bellied stove, narrower than the body, wider in the middle. The scientists have yet to find why the tissues lose their grip on the udder, but there seems to be little doubt that the weakness is inherited. It is very hard to tell early in life if the udder is likely to break down. They do recommend more frequent milking of heavy producers, to lessen the constant weight on the suspensory tissues.

Farmers Share A survey of 128 distributors in 46 states for 1957 shows that of the sale price of milk, the producers received about 47 cents on the dollar. It was 49 cents in 1956. The next biggest bite was dealers' salaries, wages and commissions at about 23 cents both years. The dealers' profit? Less than two cents.

MEYER provides complete, even cracking the full length of every hay stem, sealing in juices without stripping leaves, as hay passes between the two steel rolls.

Model No. 650

MEYER Hay Conditioner "ROLLS IN" Extra Feed Value!



NEW EXCLUSIVE MEYER PICK-UP

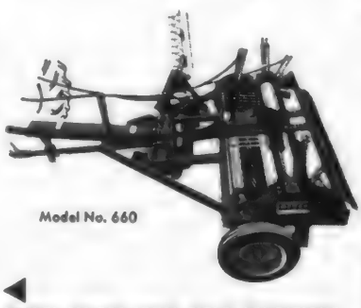
New improved large diameter Rotary Pick-Up lifts, loosens and feeds hay uniformly — floats freely over rocks and terraces. Works under **all** conditions — heavy or thin hay — smooth or uneven rocky terrain.

NEW EXCLUSIVE NON-CLOGGING ROLLS

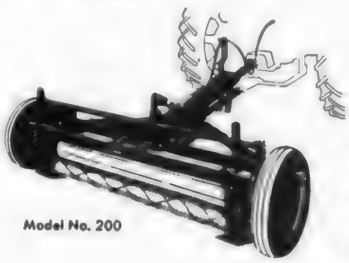
Specially designed Steel Rolls "crack" the entire hay stem uniformly — retain leaves, without clogging. Both conditioning rolls are roller-chain driven.

CONDITION WHILE YOU CUT

Meyer is 1st choice because you can use your own trailor-type or side-mounted mower — or you can get the model with built-in mower — an exclusive Meyer patented feature. Windrowing attachment is available.



Model No. 660



Model No. 200

MODEL 200 FOR IDEAL FIELD CONDITIONS

Built without separate pick-up, for use on smooth rock-and-terrace-free fields. Exclusive non-crimping rubber pick-up roll and smooth steel processing roll. Does superior job to crimper-type machine.

For best quality hay, *roll* it through a fast, rugged Meyer Hay Conditioner. Stems are cracked their entire length — not crimped — dry in half-the-time, remain pliable and keep their protein-packed leaves. Hay remains sweet smelling, natural green in color, soft and palatable, with juices sealed in — the complete feed provided by nature, without supplements. It has greater feed value . . . puts more milk in your pail . . . more pounds on your beef . . . brings several dollars per ton more than ordinary hay. Yet MEYER is priced lower.

MEYER MFG. CO.

MAKER OF FAMOUS MEYER ELEVATORS

WRITE FOR NEW ILLUSTRATED LITERATURE—YOURS FREE!

MEYER MFG. CO. BOX 6552
MORTON, ILL.
Please send literature on new Meyer Hay Conditioners. I am interested in Model — 200 — 650 — 660

Name _____

St. or R.F.D. _____

Town _____

State _____

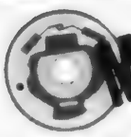
MEYER — 1st in the Field — Original and Oldest Manufacturer of Hay Conditioners with over 5 Years More Experience Than All Other Makes.

THE TRUCK WITH THE MOST!

'59 DODGE SWEPTLINE

POWER! 205 hp. in this ½-ton Sweptline pick-up . . . that's 45 hp. more than pick-up "C" . . . 19 hp. more than pick-up "F" . . . and Dodge uses regular gas!

PAYLOAD! Has more load space and hauls more load—375 lbs. more than truck "C"—200 lbs. more than truck "F" . . . saves trips and time!



BRAKES! Up to 25 square inches more lining area than in other low-tonnage trucks—you get extra safety with Dodge!

SEE YOUR DODGE DEALER

BIG BUY OF THE LOW-PRICED 3

TODAY, IT'S REAL SMART TO CHOOSE

DODGE TRUCKS

IS THERE A DAFFIN IN YOUR AREA?

The Daffin comes to your farm on a regular schedule . . . backs up to the barn . . . grinds, mixes, blends molasses with your own ingredients to make all your formula feeds . . . and you save money!

FREE—Booklet tells how easy it can be for you to get into this profitable, new, independent business. Write Daffin Mfg. Co., 3901 N. Prince St., Lancaster, Pa., USA

Daffin MODERN FEED MILLING EQUIPMENT

CONVENIENCE • • • ECONOMY • • • QUALITY

PLAN TODAY FOR A PROSPEROUS TOMORROW!

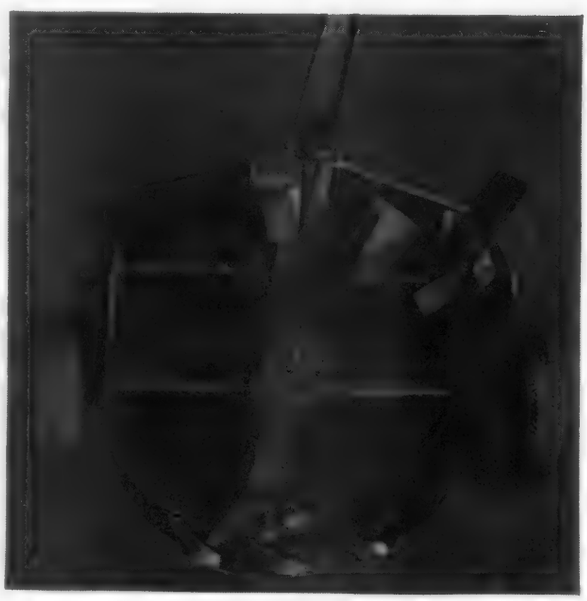
Daffin Feedmobiles have proved highly successful for both their owner-operators and farmer-customers. The profit-making ability of a Daffin offers you an excellent business-building opportunity! Be sure to write for the booklet described above.

Toughest shredding jobs a breeze for Servis Gyros

Tough, fibrous, heavy, these okra stalks are 3" across, 6' high. The Servis "Gyro" pulverizes them easily, steadily, without a hint of clogging.

Here's why...

Tremendous blade momentum gives cutting power far exceeding simple PTO action. Intermeshing blades chop exceptionally fine. Fan blades, suction skirt, deflector ribs keep stalks in the air.



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Servis EQUIPMENT CO. DALLAS, TEXAS

Servis Equipment Company
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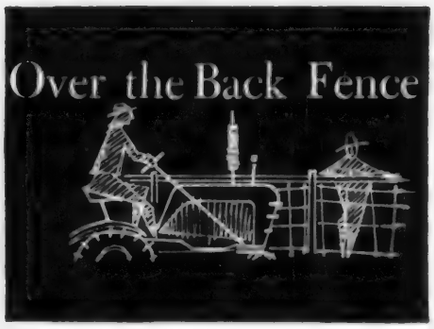
Dept. SFQ

Please send me information on items checked.

Name_____
Address_____
City_____ State_____
Type Tractor Owned_____

- ☐ Gyro 84 Brush Cutter (Pull-type)
- ☐ Gyro 66 or 57 Shredders (Pull-type)
- ☐ Gyro 66 or 57 Shredders (Lift-type)
- ☐ Gyro 60 Shredder
- ☐ E-60 Clipper
- ☐ Pasture Renovator
- ☐ B & W Row-Weeder
- ☐ No. 7 Angledozer (Row Crop Tractors)
- ☐ Dump Type Rake
- ☐ Hudson Automatic Row Marker
- ☐ 3-Way Ditcher-Terracer Blade
- ☐ Heavy Duty 3-Way Ditcher-Terracer Blade
- ☐ Model "I-H" Whirlwind Terracer
- ☐ Model "F" (3 pt. lift) Whirlwind
- ☐ "Sur-Stan" Press Wheel

"Make Pay Dirt Pay More — Join Your Soil Conservation District"



Bees Tricked by Modern Science Leave it to a nurse to take advantage of what modern science has to offer for a better life. Seems that Nurse Alice Hutzelman, Glendale, Ohio, whose hobby is beekeeping, got hold of a bunch of mean German bees that stung her often and thoroughly. She was about to dump them out when she hit on the idea of calming them with tranquilizers. She mixed the stuff in syrup and the results were amazing. She can now handle the critters without gloves or a net. She has 79 hives in her apiary, all painted pink, which, to our way of thinking, would make any bee unfriendly.

Gooseberry Battle Rages Our comments on gooseberries in our last Back Fence column brought a storm of protest and abuse on our innocent head. Gooseberry aficionados throughout the nation sprung to the defense of that lowly berry. Especially lyrical was the praise for the wild variety. Mr. John Larkins, of Santa Fe, New Mexico, says, "I like gooseberries because they taste like gooseberries. They are supposed to be tart, but I'll never admit they lack flavor (not those wild ones) and I wouldn't want them to taste like currants or grapes. If such logic fails to impress you, it wouldn't surprise me a bit."

What's in a Name? John T. Wright, a Leeds (England) University professor, tells us that *stooking* in the harvest field is *hattocking* in Lancashire, and *stitching* in the southwest counties. Professor Wright's comments on the farm dialects of England would have been clearer to his American readers had he translated the English for us. *Stooking*, for example, is nothing more than U.S. *shocking*. We also learn from Professor Wright that a *runt* pig is a *recklin, riddlin, rutlin, dillin, nisgul*, or a *petman*, depending on what part of England he is found. The Professor would certainly be floored by Americanisms such as critter, shote, varmint, stag, biddy.

See Almanac for Fallout Date The U.S. Department of Agriculture recently released Farmers' Bulletin No. 2107 dealing with "Defense Against Radioactive Fallout on the Farm." In a logical and reasonable statement, the Department urges that cows be milked before radioactive fallout occurs because, ". . . you may not be able to do so for a day or two afterwards."

Tractor Magic

TO EXTEND THE WORK-RANGE OF YOUR PRESENT TRACTOR

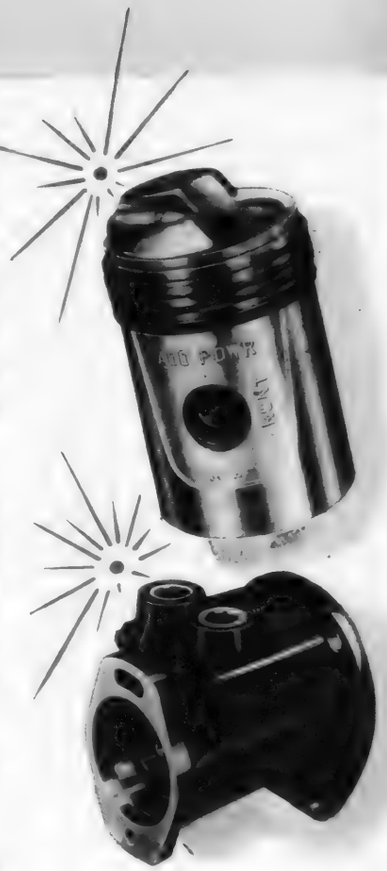
If you can't be satisfied with less than maximum power...then M&W TURBO-DOME Pistons are for you! They'll increase the *work-size* of your tractor to handle bigger, heavier, modern tools . . . provide *extra muscle* that's needed when the going is tough. *And use less fuel per unit of work.*

Concentrated firepower from Turbo-Dome's exclusive Inverted Turbulence Chamber is the reason you get your money's worth from every tankful of today's improved fuels.

Lick your special power problem with M&W TURBO-DOMES. They meet the most unusual power demands . . . give you maximum performance from your present tractor.

M&W Live Hydraulic Systems provide positive control of all tools at the touch of your finger—and with capacity to spare for all the latest and heaviest hydraulic powered equipment. Control is continuous and instantaneous. There's an M&W Live Hydraulic system custom engineered to fit your tractor. Handles two-way or one-way operated tools—completely independent of transmission, clutch and PTO. Your older tractor need not be limited in its work-range. You can have an up-to-date M&W Live Hydraulic System at a surprisingly modest cost!

See your M&W Dealer today for the work-range of tomorrow from yesterday's tractor!



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Write for your copy of FREE booklet—**LASTING POWER**

M&W TRACTOR PRODUCTS

3913 GREEN STREET
ANCHOR, ILLINOIS

PROVEN BY FARMERS IN EVERY ONE OF THE 49 STATES

Johnny Brown's crops were a sick-looking sight,
They were droopy, and weak, and grew but a mite.
While wise Carl Johnson's weren't sickly at all,
And some of them stretched near to seven feet tall!

One day, as young Brown was bemoanin' his lot,
And telling his friend how his crops went to pot,
Wise Johnson observed, "I'd say that they totter,
Because they're not getting enough growing water!

"Get USS National Polyethylene Pipe!
Irrigation with ease, keeps crops fresh and ripe.
A snap to install; it's so easy to do.
It goes around corners, and 'neath fences too!"

Young Johnny Brown took friend Johnson's advice,
And now his crops bring the top market price.
Production has climbed, and credit is laid
To National Pipe—NSF Grade!

Remember, USS National Polyethylene Pipe unrolls like a hose, resists acids, alkalies and rot, performs efficiently in a temperature range of −90°F. to +120°F., and won't crack or break in sub-zero weather.

National Polyethylene Pipe comes in lengths up to 400', in diameters from ½" to 6". And, it's made of 100% virgin polyethylene plastic to which 3% carbon black filler has been added to prevent deterioration from ultra-violet rays. Insert fittings in nylon and styrene copolymers (NSF) are now available from National Tube. For complete information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

This seal of the National Sanitation Foundation means Tested ... Approved ... Sanitary!

nSf

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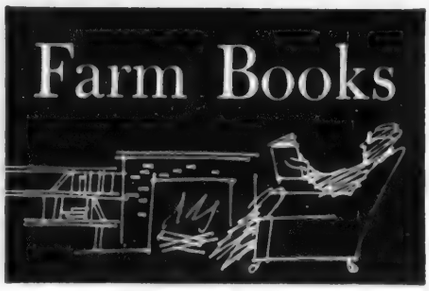
"The world's largest and most experienced manufacturer of tubular products"

National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Export Company, New York

Farm Books



Introduction to Agricultural Economic Analysis, *by C. E. Bishop and W. D. Toussaint. John Wiley & Sons, Inc., New York. $5.25.*

The elements of economics adapted to the solution of problems in agriculture.

Here is a new and different approach to economics and farm management. It contains a number of formulae for determining such things as how much fertilizer to apply in relation to the anticipated price of the harvested crop; working out an equitable cash rent; and so on. The reader who likes to figure with pencil and pad as he reads will find this a stimulating item.

Breeding for Beef, *by H. H. Stonaker, Colorado Agricultural Experiment Station, Colorado State University, Fort Collins.*

This booklet summarizes 11 years of beef cattle research with a range herd of some 150 to 180 Hereford cows and heifers. Commercial cattlemen will find it highly thought-provoking.

Tree Fruit Production, *by Shoemaker and Teskey. John Wiley & Sons, Inc., New York. $6.95.*

Four hundred pages of the most detailed information about growing apples, pears, peaches, cherries, plums, nectarines, quinces, and citrus fruits.

The book gives the newest revisions of "standard practices" and covers grafting, diseases, insects, soil and climate requirements, pollination, fruit setting, pruning, thinning, harvesting, and storage.

Farm Tractor Maintenance, *by A. D. Brown and I. G. Morrison. The Interstate Publishers, Danville, Illinois. $3.50.*

A simple summary of tractor upkeep. The authors include many illustrations, and the text is clear and short. The book explains the operation of many of the working parts of a tractor—better to explain the "whys" of maintenance. Not a book for the expert, but the beginner—student or mechanic—could do worse.

Dairy Cattle Judging and Selection, *by William W. Yapp. John Wiley & Sons, Inc., New York. $5.95.*

A broad coverage of the assessment of type in dairy and dual-purpose cattle.

The basic qualities are discussed, the interplay of udder appearance and function, and the main dairy breeds are reviewed. This is a well-written summary of the structure and appearance of the milk animals and should be an excellent guide for teachers or students of judging.

The Short-Couple to Bigger Tonnage

It's Oliver's TEAMED-POWER

THE TRACTOR: The TEAMED-POWER Oliver 770 —now up-powered into the top of the 4-plow class and also the ideal baling tractor. It's powered right for the job—with 6-cylinder smoothness for steady going. Oliver's Power-Booster Drive gives you 12 forward speeds—one for every baling condition—and always a stopless shift to fit your ground speed to the baling load. You have *Independently Controlled PTO*—no tire-some clutching and shifting. And for economy, you can choose the fuel that suits your area best: gasoline, diesel or LP-gas. You'll never miss with this Oliver tractor and...

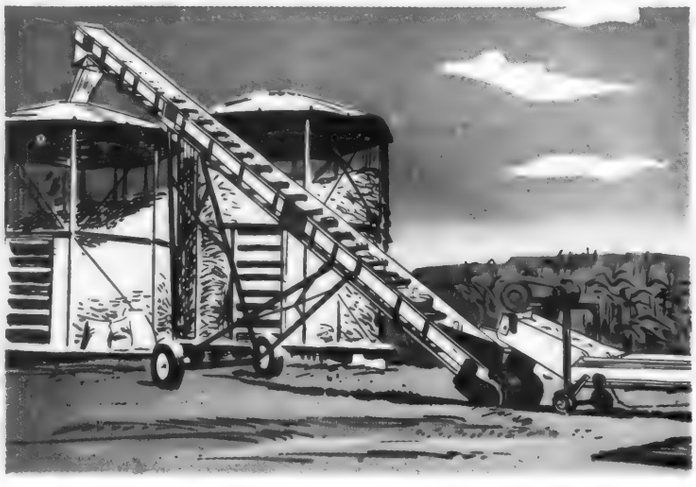
THE BALER: It's the high-tonnage Oliver 60—with the close-coupled pivot-balance hitch. Lets you follow the snakiest windrows without power interruptions... keep baling on tight turns, over rough fields. You bale *10 tons and more per hour*—hour after hour. Wire-tie or twine-tie, they both pay off in the *field* and in the *bale*. Your bales are even density from end to end, all sliced for easy feeding—in half a minute you can set any length you want. With the 770 up front, the Model 60 baler behind, what a season you'll have—there's nothing like Oliver's TEAMED-POWER.

THE OLIVER CORPORATION
400 West Madison Street, Chicago 6, Illinois

See Your OLIVER DEALER and See

FOR HAY: *Model 155 New Holland-Smoker Elevator* can be loaded directly from the drying wagon. Exclusive 60° elevation means the "155" costs least per foot of actual elevating reach. Top drive motor eliminates chain kinking.

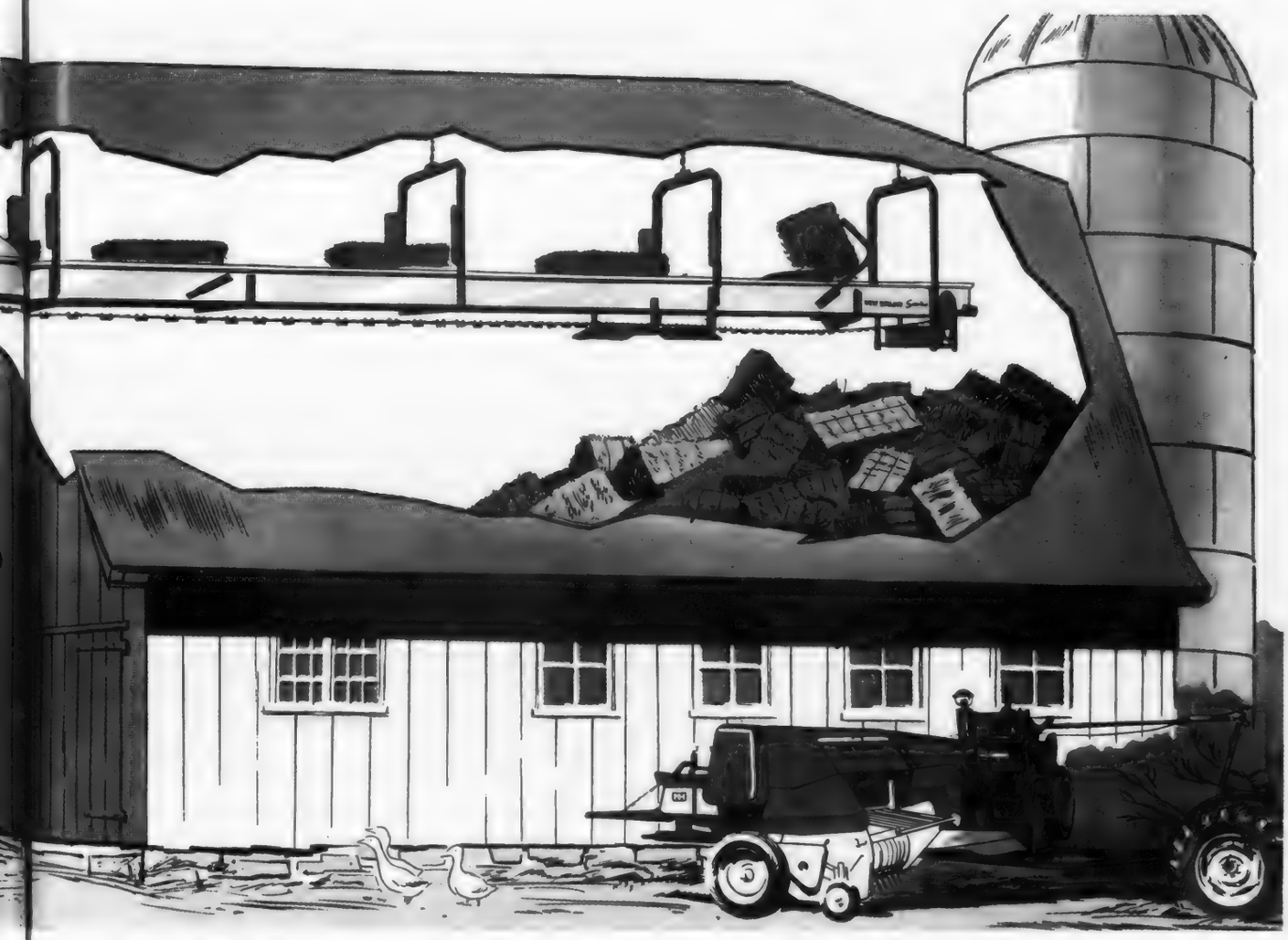
Now! Complete crop-handling



FOR CORN: Mechanized corn and grain handling can save you at least 75% of unloading time. Here, a New Holland-Smoker Model 140 Elevator is teamed with a New Holland-Smoker Self-Powered Model 122 Corn Drag. And the "155" Elevator is just as versatile.

FOR SILAGE: New Holland's "336" Manure Spreader with Forage Box joins a Model 22 Forage Blower to store 48 tons of silage per hour! With a cross-conveyor attachment, the Spreader with Forage Box becomes an Automatic Bunk Feeder, lets one man feed hundreds of animals in minutes!

BALERS • FORAGE HARVESTERS • MOWERS • RAKES • HAY CONDITIONERS • CROP DRYERS • CROP DRYING WAGONS • MANURE SPREADERS • FERTILIZER DISTRIBUTORS



Model 160 New Holland-Smoker Mow Conveyor receives bales directly from elevator and discharges them at 12′ intervals. As mow is filled, bale discharge unit is easily moved to next discharge station.

systems by New Holland!

Now you can have on your farm a complete, flexible system of farm-engineered scientific equipment to handle your crops.

Not only can you save crops themselves from the bottleneck of handling at critical times, you can save back-breaking handling of heavy materials, save costly time in getting your crops from field to storage. And you can do it all with matched equipment from the leader in grassland farming—New Holland.

For New Holland now has several spanking new, yet tried and true, members of its machinery family. They're the elevators, mow conveyors, bale boosters, corn drags, corn and grain boxes, and field bale loaders of the former Smoker line, recently acquired by New Holland. Rugged, foolproof, highly versatile, this equipment has a long-standing reputation for filling farmer's crop-handling needs. You'll be amazed—and delighted—by the variety of work these machines can do.

Your local New Holland Dealer can give you full details about the New Holland-Smoker line. Or write New Holland Machine Company Division of Sperry Rand Corporation, New Holland, Pa.

NH

NEW HOLLAND

"First in Grassland Farming"

• FORAGE BLOWERS • FARM WAGONS • BALER TWINE AND WIRE

New Holland Machine Company
903 Oak Street, New Holland, Pa.
Please send me a FREE catalog on the New Holland-Smoker line of Crop-Handling equipment.

Name_____

Address_____

Accurate records...

save time for your veterinarian, save money for you

When your veterinarian examines your herd, he's looking for trouble. That's part of his job of Animal Health Engineering: to recognize symptoms of injury or disease while still in the early stages—to make careful diagnosis—to start treatment fast—to keep every one of your animals producing at maximum profit. Here's how you, *and only you*, can help.

Keep accurate records! Save time for your veterinarian, help him save money for you. Always be ready with accurate, up-to-date records for every member of your herd. Make each "case history" as complete as you can, including: date in heat, date bred, date due to calve, date calf dropped, records of milk production and feed consumption. If animals have been treated for injury or disease, write it down! Your veterinarian can help you *faster* when he has *all the facts!*

New drugs—modern miracles of Animal Health Engineering. Every time your veterinarian calls, all the skills of modern veterinary science come with him. He brings to your barn an intimate knowledge of the newest and most effective drugs which have saved countless numbers of America's valuable livestock. Many of these new drugs are products of the Squibb Research Program, and Squibb is proud of its part in the development of these modern miracles of Animal Health Engineering.

FREE! NEW HERD BREEDING CHART!

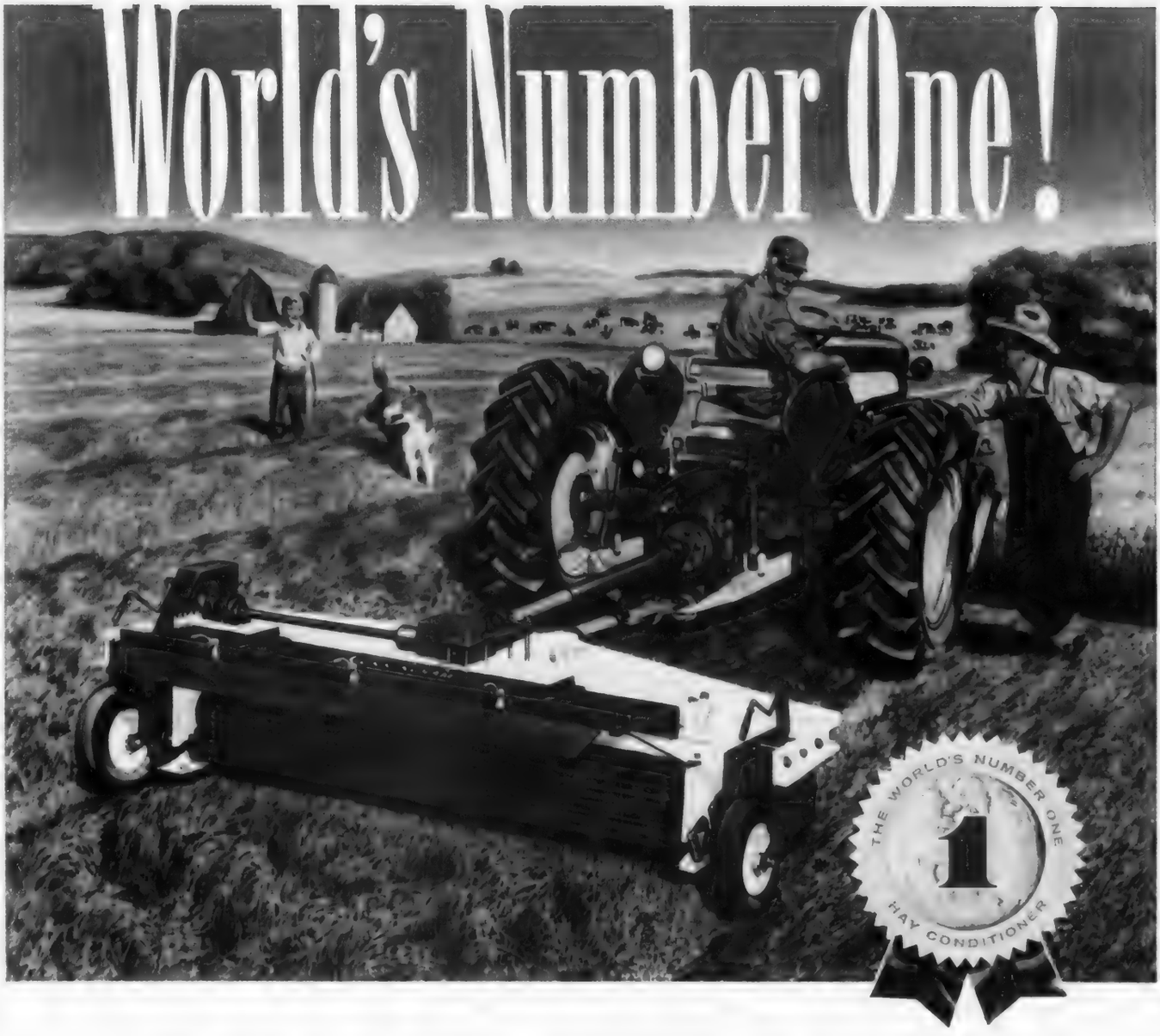
Send for Squibb's famous herd breeding chart to post on your barn wall. Makes record-keeping quick and easy. Write SQUIBB, *Veterinary Dept.*, 745 Fifth Avenue, New York 22, N. Y. and tell us the number of cows in your herd.

©OLIN MATHIESON CHEMICAL CORPORATION, 1950

SQUIBB

SQUIBB—A NAME YOU CAN TRUST

World's Number One!



Haytime is the time for experience-not experiments

Condition with a Cunningham.... with more acres of conditioning experience than all the other makes combined

Beat the weather... get your hay out of the field 50% to 80% faster without losing protein-packed leaves. Cunningham's "crimping action" sets up a perfect curing time-table... crimped stems cure as fast as undamaged leaves. You'll feed full protein hay all winter and eliminate costly supplements.

The Cunningham is the finest, most dependable machine of its kind ever manufactured and is universally accepted as the World's Number One Hay Conditioner. The experienced Cunningham has earned this vote of confidence by saving 90% of the top value, protein-packed hay leaves in millions of acres of hay. *20 acres... 200 acres... 2,000 acres... it will do the same for you... at low cost... in less time... without trouble.* Go by experience... go buy Cunningham and you'll agree that next to nature's growing magic, Cunningham conditioning is the best thing that ever happened to your hay

Go By Experience

Go Buy Cunningham

Clip, fill in, and mail today for FREE full color folders

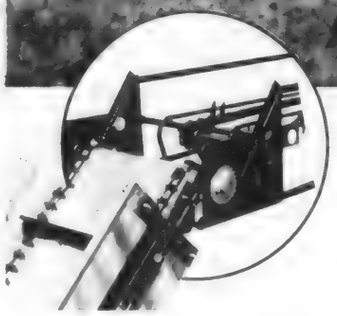
RAY CUNNINGHAM & SONS, INC., LA CROSSE 22, WIS.

NAME_____

ST. or R.R._____

TOWN_____ STATE_____

☐ Check here if you are a student



BALE MOVER

"Handles like a ladder

BALE MOVER CONNECTOR

ATTACHES ANY BOTTOM SECTION BALE MOVER TO TOP OF 1958 GALVANIZED ELEVATOR, DRIVES FROM NEW 1958 ELEVATOR HEAD SHAFT

18 FT. BOTTOM SECTION $79

18 FT. EXTENSION $69

PRICES F. O. B. DODGE CITY, KANS., OR COMPTON, ILL.

MAYRATH

WORLD'S LARGEST SELLING AUGERS, ELEVATORS, BALE MOVERS & CROP SPRAYERS

An on-the-farm report from a MOLINE owner . . .

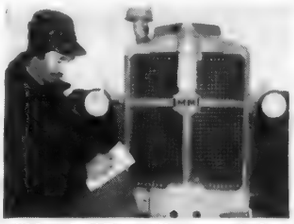
"I'll put my 5-Star up against any tractor in the county!"

"MY MOLINE 5-STAR tractor is tops for dependable, month-in, month-out performance," says Clarence Grothe of Pine City, Minnesota. Grothe, who runs a 260-acre dairy operation, has been farming for 20 years—has, at one time or another, tested almost every kind of farm machinery made. "You can't beat MOLINE," he says.

"I bought my LP-gas 5-STAR a year ago last October and since then I've used it for all general work on my own place as well as on custom jobs for my neighbors. But I haven't had a minute of downtime with it. It's sure given me good performance—and on some tough jobs, too. It'll take a beating.

"And it's got all the power I need—really economical power. I plow over 3 acres an hour with four 16-inch moldboard plows, and it uses less fuel than any tractor I've ever owned. My 5-STAR has got a real *tractor* engine, too—with power that can't conk out. It's a lugging brute! I've compared tractor performance, and there's just nothing in its horsepower class that will stay with it.

"With 5-STAR's Ampli-Torc I don't have to stop and shift gears. And my 5-STAR has the traction I want, too—better traction than any other make I've ever used. All told, MOLINE is the tractor for me—it's *built* for a farmer."



"My 5-STAR is really economical—I plow over 3 acres an hour and use less fuel than ever before."

"With Ampli-Torc I can plow in high range at 4½ m.p.h. with four 16-inch bottoms. That's real power."

"When I hit a tough spot, Ampli-Torc *doubles* my power to get me through it. That's a real help."

"My 5-STAR has the traction I want—better traction than any other make of tractor I've used."

"I like the visibility from the seat. This is one tractor where you can always see what you're doing."

"Come the end of the day, I'm not tired out. That's important when you farm a good-sized place."

See the 5-STAR now at your MOLINE dealer's—the *big* tractor with the heavy-duty Tel-O-Flo hydraulic 3-point hitch!

MINNEAPOLIS MOLINE

Wendel Baker and his son-in-law, Bob Kearn, examine an immature potato plant with 7-foot vine, pulled from their irrigated field.

Bob Kearn and John Oldfield, Irrigation Engineer, check over the 7-year-old Model 55M Pump and find it fit for another year.

Replacing this irrigation pump is a problem for the next generation

"Someday," says Wendel Baker, whom *Farm Quarterly* describes as Ohio's Big Irrigator, "my Gorman-Rupp Pump, installed in 1947, will have to be replaced. But," he adds with a twinkle, "it will probably be a transaction between John Oldfield and my son-in-law, Bob Kearn."

For there's no sign of a let-up in performance of this first Gorman-Rupp Pump or of others purchased later. Engineered to the specific job, it has faithfully delivered millions of gallons of water to the 230 rolling acres of the Baker farm at Urbana, Ohio.

As part of the irrigating system used to supplement the area's 39.67 inches of average yearly rainfall, the unit has helped to more than double Baker's annual crop production.

Says John Oldfield, irrigation system engineer: "Stamina and utility are characteristic of Gorman-Rupp pumps. They're built to last, and their design features make them the most practical of irrigation pumps. For example, automatic check valves that seat out of the water flow. Shaft seals protected from water-borne abrasives, and safety controls that permit pump and engine to operate for hours unattended.

"With more than fifty models to choose from, there's no irrigation problem that can't be solved—efficiently and permanently."

NOTE TO PROFIT-MINDED FARMERS:

Start cutting costs and increasing production. See your Gorman-Rupp dealer about an irrigation system engineered to fit your needs . . . for now and for years to come.

THE GORMAN-RUPP COMPANY

305 Bowman St. • Mansfield, Ohio

You're miles ahead with the

DYNAMIC D-17

FIELD TEST SHOWS IT—TRACTION FLAG PROVES IT! When today's big tractors match traction, power and economy . . . the dynamic Allis-Chalmers D-17 really talks!

On opposite sides of the above field, a D-17 and another late model tractor *weighing 1950 lbs. more* started discing at the same time. They worked toward the center and met on the dotted line . . . 2 hours and 32 minutes later.

This actual airplane photo shows how much more ground the D-17 covered. Its Power Director (*the Big Stick*) and automatic TRACTION BOOSTER system enabled the D-17 to pull a big 15-ft. Allis-Chalmers tandem disc . . . hub deep . . . *on 20 percent less fuel per acre.*

TRACTION MADE THE BIG DIFFERENCE! The Traction Test flag, bolted to the drive wheel so the driver could count revolutions, showed 3,047 feet less slippage by the D-17 pulling a bigger disc (over a foot wider) and covering more acres. This difference in slippage means that a D-17 Tractor could save 30 or more miles of lost motion every year . . . eliminating unnecessary grinding away of rubber and wastage of fuel.

You will gain those extra miles of work with a new D-17 or D-14 Tractor . . . and be miles and money ahead. A demonstration on your own farm will prove it. See your Allis-Chalmers dealer.

Listen! *National Farm and Home Hour—NBC—Every Saturday*

TRACTION BOOSTER is an Allis-Chalmers Trademark

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

"The Eaton 2-Speed Axle is part of PROFITABLE MATERIAL HANDLING"

—SAYS LOVELL MYERS, CO-OWNER, MYERS FARMS, INC., CEDAR RAPIDS, IOWA

"Modern field machinery teamed with our six Eaton-equipped Ford trucks makes our corn, cattle and sorghum handling easier and faster," says Mr. Myers. "Without a doubt, our Eaton 2-Speed Axles speed hauling, cut man-hours and increase profits.

"Farming our 2000 acres, one of the chief advantages of the Eaton 2-Speed is its wide gear range. In the low-gear ratio the truck moves slowly and steadily along with field machinery—at only 2 or 3 miles per hour, if necessary even in mud.

"On the road, Eaton's high-gear range saves gallons of gasoline and cuts roughly 25 percent off trip time. Equally important, the Eaton trims motor maintenance costs to the bone because engine RPM, wear and strain are all reduced. And we enjoy these savings without sacrificing load capacity—our Eaton-equipped trucks haul full payloads under all conditions." For advantages like these, you need an Eaton 2-Speed Axle. Ask your truck dealer for a demonstration.

"TRIPS TO MARKET are fast and steady—with an Eaton 2-Speed we can pick up speed and slow down gradually, without jerking or stalling. The lower operating costs of an Eaton-equipped truck plus the higher trade-in value mean money in the bank."

FORD TRUCK DEPT. MGR. Howard J. Glass, Stevenson Ford Co., Cedar Rapids, Iowa, says: "I've sold Eaton-equipped units that are still going strong after hard use for 200,000 miles and more. I recommend the Eaton Axle to my customers because it makes a truck more versatile, assures fewer repairs and extra trucking efficiency."

EATON

2-SPEED TRUCK AXLES

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

JOHNSTONS
MAKE THE
DIFFERENCE
Reliable Johnston vertical irrigation pumps make crops grow better – insure higher yields – increase profits even during periods of rainfall.
FOR CONVINCING PROOF, ask your Johnston dealer for a demonstration or write directly to a factory warehouse. Johnstons are available in almost unlimited combinations, from fractional units to 1,000 hp giants, each designed to give the ultimate in service and economy.
1909-1959
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JOHNSTON
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Bin K, Pasadena, California
FACTORY WAREHOUSES: Raleigh, S.C.; Hastings, Neb.; Roswell, N.M.; Pecos, Texas

HOW'D YOU LIKE TO WORK 105 HOURS A DAY?

Years back, the farmer behind a two-horse plow could do about 1.5 acres a day, the hard way. Today with a tractor-drawn plow, a farmer can easily do 21 acres a day—equal to 105 hours' old-fashioned work!

That's Better-ness—the American conviction that good enough isn't. It created the first reaper. Then the binder and tractors and combines. And all the machines that help today's 2,000,000 fewer farmers feed 30,000,000 more people—just since 1940.

Helping make this farm mechanization possible are Timken® tapered roller bearings. They are at the hub of Better-ness—keeping wheels and shafts turning smoothly.

Timken bearings *roll* the load instead of *sliding* it—practically eliminate friction. Their tapered design lets them take *all* the punishing loads of farm work. They reduce breakdowns—roll longer with less maintenance.

Look for Timken bearings on the machines you buy—because Better-ness rolls on Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO". *Makers of tapered roller bearings, fine alloy steels and removable rock bits.*

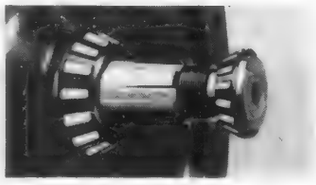
Every make of American tractor uses Timken bearings—more and more implements are using them, too!

BETTER-NESS rolls on

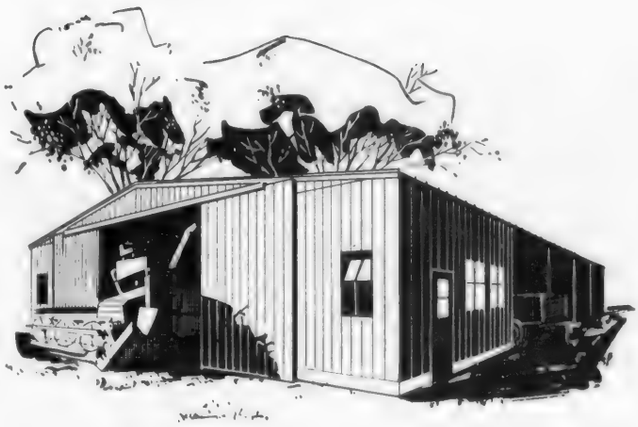
TIMKEN®

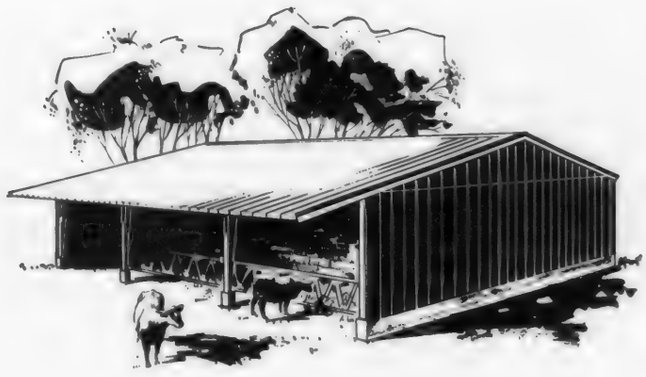
tapered roller bearings

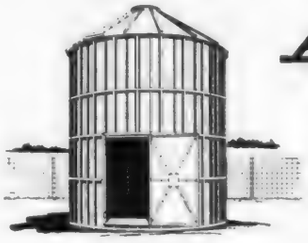
First in bearings for 60 years



Typical application of Timken bearings on tractor axle.

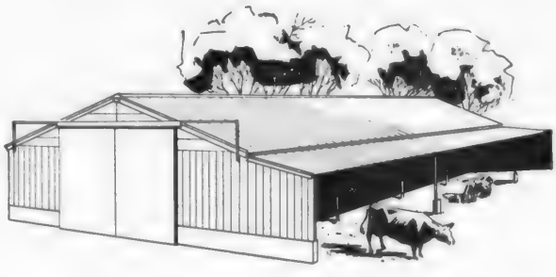


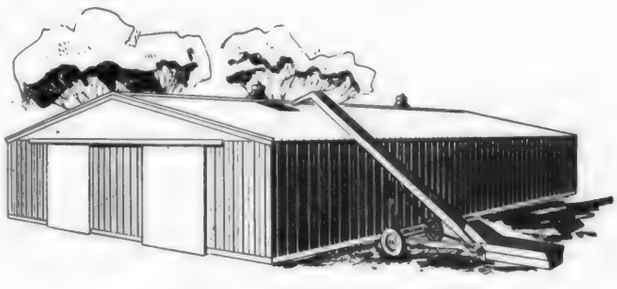




Armco Steel Buildings...

A Better Way to Build For Every Farm Building Need





Here is one more reason why Armco Steel Buildings are a better way for you to build—for *every* farm need. With each of the more than 5,000 Armco Building sizes, you get an unsurpassed selection of doors, windows and other building accessories. The unique Armco Building system lets you choose the type, size and even the location of the doors and other openings you need. Result: a building tailored for your farm operations—with a price tag that reflects production line economies. Send for complete facts today. Use the handy coupon.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
149 Curtis Street, Middletown, Ohio

Please send me the Armco Farm Building Catalog. I am interested in Armco Buildings for the following uses:_____

_____ Approximate Size:_____

Name_____

Street or Box Number_____

City_____

County_____ State_____

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
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FEEDING NEWS & SERVICE*

SPRING BULLETIN NO. 2

INTERNATIONAL SALT CO., INC. • SCRANTON, PENNA.

"For continuing high milk production, I feed Sterling Blusalt the year round!"

". . . and I've been feeding it three different ways since it was introduced over 10 years ago," says Walter E. Marshalsea, successful dairy farmer from Salem, N.Y.

"First, I mix at least 20 lbs. of Blusalt per ton of feed. Second, I toss 2 ounces of Blusalt on top of every cow's daily ration of grain and silage. Third, I feed Blusalt free choice, using 50-lb. blocks on pasture. I'm sure that the salt and trace minerals in Sterling Blusalt are helpful in maintaining milk production at a profitable, high level."

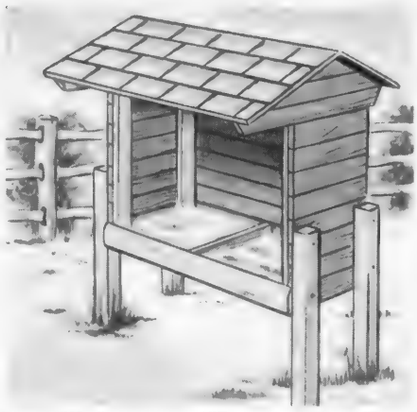
Mr. Marshalsea grows all the hay, corn and oats he needs on his 77 acres of tillable land. His 50 milking cows are stanchioned in a clean, modern barn that is equipped with a bulk milk tank.

Now's the time to build a salt-mineral feeder!

One of the more important needs for pasturing cows is a supply of salt and trace minerals on the pasture itself. Your cows need extra salt to balance the high liquid intake caused by eating pasture containing up to 80% moisture. And they need extra trace minerals because, as soil chemists have proved, much of today's heavily grazed pasture is mineral-deficient.

An excellent way to supply vital salt and trace minerals is to use a feeder like the one shown here. This feeder is easy to build. It stands up well under rough treatment. And it's large enough to require only occasional refilling.

Once your feeder is ready, just empty a bag of Sterling Blusalt into one side, and you've got a supply of *both* high-quality salt and seven trace minerals needed for good growth and reproduction (manganese, iron, sulfate sulfur, copper, cobalt, iodine, zinc). In the other side, supply a source of phosphorus and calcium such as bone meal or one of the many good calcium phosphorus supplements.

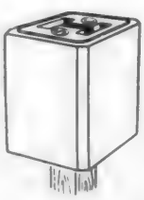


Feeder designs free. If you'd like further information on trace-mineral needs for pasturing livestock—or plans for this and other feeders, free—contact International Salt Company's Animal Nutrition Department in Scranton, Pennsylvania.

STERLING BLUSALT: trace-mineral salt for free-choice feeding and for your custom grist mixes

100-LB. BAG

Blusalt contains high-quality salt plus seven trace minerals essential to good growth and reproduction. Look for Blusalt in 50- and 100-lb. bright blue bags, 4-lb. blue Liks and 50-lb. blue blocks.



50-LB. BLOCK

Also available from your feed dealer . . .

STERLING GREEN'SALT . . . trace-mineral salt plus 10% phenothiazine for control of certain internal parasites. In 100-lb. and 25-lb. bags. 25-lb. bags have a handle for easy handling and carrying.

STERLING GRANULATED SALT . . . premium-quality white salt for both feed mixing and free-choice feeding. In 25- and 100-lb. bags. Also pressed into 50-lb. blocks and 4-lb. Liks—plain, iodized and sulfurized.

GUARANTEED ANALYSIS OF STERLING BLUSALT

Sterling Blusalt in bags or in 50-lb. blocks or 4-lb. Liks is guaranteed to contain the following amounts of salt and trace minerals—which are stable and available to all livestock and poultry.

Salt (NaCl)	not more than 99.000%
Salt (NaCl)	not less than 97.000%
Manganese (Mn)	not less than 0.250%
Iron (Fe)	not less than 0.100%
Sulfate Sulfur (S)	not less than 0.100%
Copper (Cu)	not less than 0.033%
Cobalt (Co)	not less than 0.015%
Iodine (I)	not less than 0.007%
Zinc (Zn)	not less than 0.005%

Service and research are the extras in

STERLING FARM & FEED SALT

MAKERS OF STERLING... REAL SALTY SALT!

"We Traded In A Direct-Expansion Cooler And Bought A DARI-KOOL!"

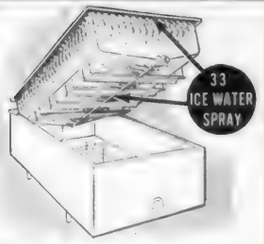
MR. & MRS. HAROLD WITT, Williamston, Michigan, write—
"We traded in a 400-gallon direct-expansion tank, of a well known make, and bought a 500-gallon Dari-Kool.

One of the things we like best about our Dari-Kool is its fast cooling. The milk never gets over 40° — *ever.* The blend temperature of the milk in the direct-expansion tank used to get as high as 60°, when the second milking was poured in on the first milking.

Our Dari-Kool, with its moist milk tank sidewalls is much easier to wash than our other tank. The milk doesn't dry and harden on the milk tank walls. Even the lids are easier to wash.

Another feature we like is the 2-speed agitation. Now, for the *first time* I am really sure of getting an accurate butterfat sample!"

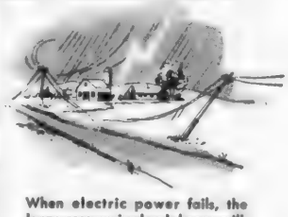
Signed, HAROLD WITT, EULA WITT, November 17, 1958



33° ice water is "pressure-sprayed" against all 4 sides and the entire bottom of the milk tank. Milk heat is removed faster.

Dari-Kool's fast cooling helps to keep milk quality high and protect it against possible rejection due to high blend temperatures.

Dari-Kool tanks are much easier to clean, because the cold milk tank walls are always moist. This retards milkstone deposits.



When electric power fails, the large reserve ice-bank keeps milk safely cold for many hours. In some coolers, the milk is lost.

The ICE-BANK Cooler that Outperforms and Outsells them all!

Remember there is as much difference between a Dari-Kool and other ice-bank coolers as there is between a Dari-Kool and a direct-expansion tank.

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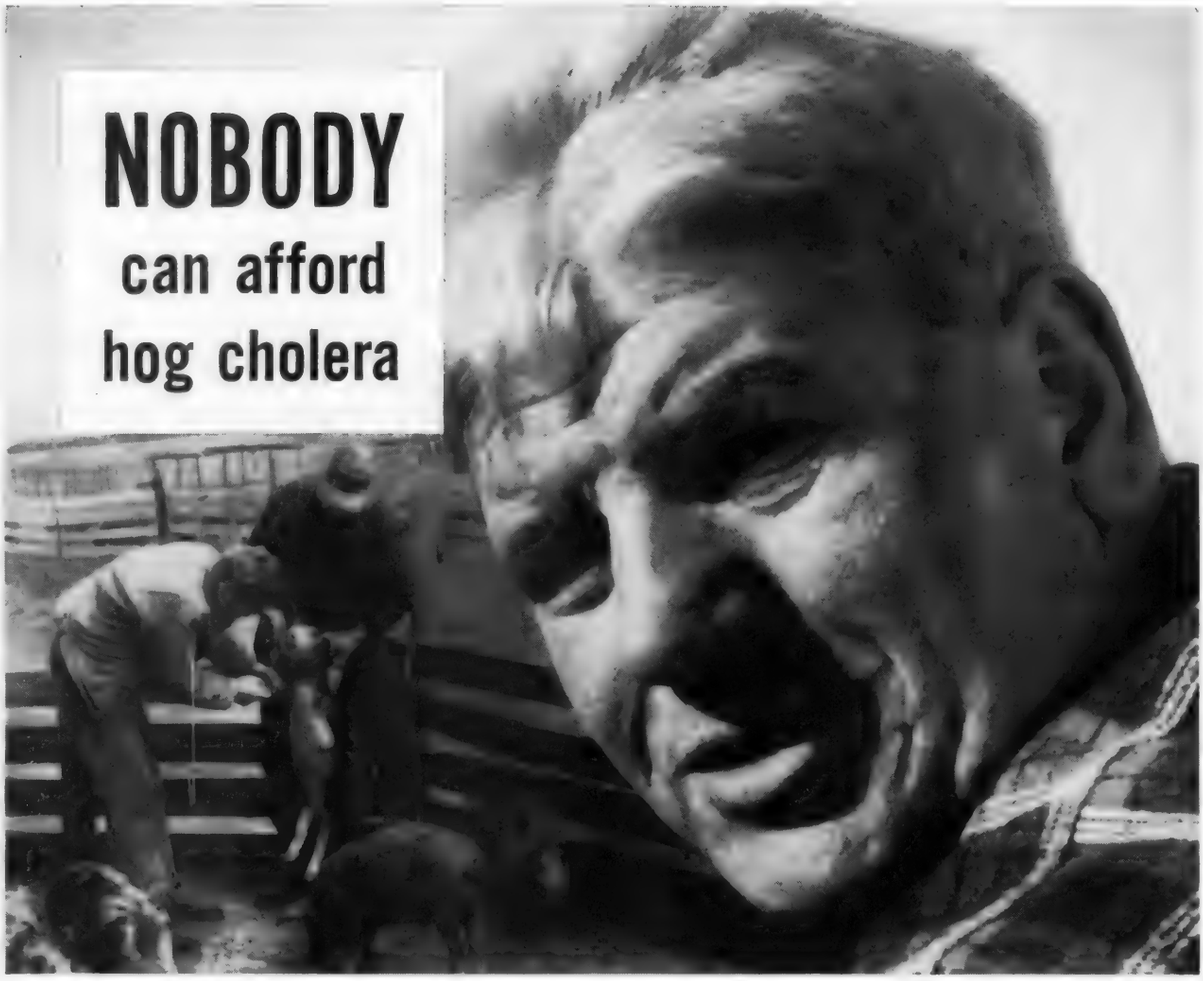
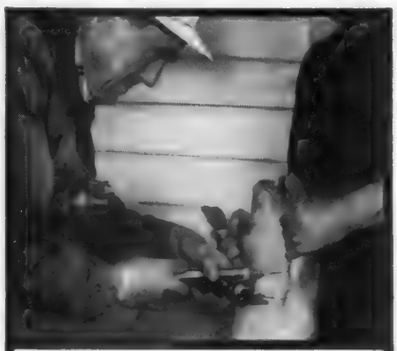
BULK MILK COOLER

DAIRY EQUIPMENT COMPANY
DEPT. 20, MADISON, WISCONSIN
Manufacturers of KARI-KOOL Truck Tanks





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your
veterinarian

he knows best
—what's best

"Press my luck? Not me. I'm vaccinating every pig!"

Cholera warnings are out. Don't ignore them. They are serious warnings, issued by people who know the dangers. These authorities urge vaccination because cholera cannot be cured—its spread can be stopped only by vaccination. Laxness in vaccinating invites cholera outbreaks. Keep your defenses up. Practice and preach vaccination. Have your own pigs vaccinated on schedule by your veterinarian.

Through the last 8 years thousands of veterinarians have given millions of swine protection with Fort Dodge M·L·V. The first-licensed modified live virus vaccine. Used simultaneously with serum, it gives immediate protection, establishes long-lasting immunity, is safe. M·L·V is patented. Made by the world's largest exclusive producer of veterinary products.

Fort Dodge Laboratories, Inc., Fort Dodge, Iowa

FORT DODGE® **M·L·V**

The original modified live virus hog cholera vaccine

IN ONLY

4 YEARS

CHORE-BOY

HAS FORGED INTO LEADERSHIP IN PIPELINE MILKING SYSTEMS

The rapid progress that Chore-Boy Pipeline Milking Systems have made is the subject of highly favorable comment among informed people in the dairy world. This is not surprising, since the many Chore-Boy Systems in use are proving so very satisfactory. The enthusiastic owners are passing the good word on to their friends and neighbors. This has resulted in wide spread acceptance.

Four years ago Chore-Boy decided to specialize in the production of pipeline milking systems. It was evident that modern dairying demanded faster, better milking than could be provided by pail milkers. While we make excellent pail milkers, both suspended and floor type, we believe pail milking to be obsolete. They require too much bending, stooping and squatting, plus unnecessary walking and considerably more time to operate.

The result of our fresh, new approach is a completely new pipeline system combining 15 major advantages, with exclusive, patented features not available in any other brand.

Chore-Boy also introduced the Herringbone Stalls and Feeding System with 15 additional advantages enabling two to three times as many cows per man to be milked as with other methods. We are not concerned with producing the most milkers — only the best.

HERRINGBONE OR AROUND-THE-BARN

For Any Size Herd
Small, Medium, Large

Mr. M. C. Nash, Farm Supt. of Campion Academy, Loveland, Colorado, writes —

"We have been using our Chore-Boy Double-6 Herringbone Milking System since November 19, 1958. We feel that no other method can approach the Chore-Boy in the low-cost production of high quality milk. The Chore-Boy Roll-O-Measures have enabled us to determine the production of each cow and also provide samples for testing. More than 900 people have visited our plant. In our opinion this is the only way to milk cows."

Mr. R. E. Rappold, Lake View Dairy Farm, North Java, New York, writes —

"Since installing our Chore-Boy Pipeline Milking System we find it is a pleasure, rather than a chore, to milk our herd. It saves us time and labor because we do not have to carry the milk. Because of the gentle, low-vacuum milking we have experienced no mastitis problems. We are producing top quality milk because the bacteria count is kept at a minimum. The Chore-Boy pipeline is cleaned "in-place". My 12 year old son operates 3 units, with ease."

BETTER MILKING — FASTER MILKING

Because 60 cows per hour per man can be milked with a Chore-Boy Double-6 Herringbone Pipeline Milking System some people have the impression that the cows are not properly milked. This impression is wrong — and here is why: (1) The cows are handled in groups, eliminating the operation of doors and gates for individual cows. (2) Walking is reduced to a minimum because the operator is always within 3 feet of the next cow's udder. (3) Automatic feeding saves time and walking. (4) These savings in time enable the operator to handle more milker units. (5) Each cow receives as much attention and time to milk as any other method.

In addition, Chore-Boy Low-Vacuum, combined with Master Pulsation, milks cows better and faster. Low-Vacuum helps eliminate a major cause of mastitis. Chore-Boy's patented Master Pulsation gives a milking action that is fast, thorough and pleasing to the cows. Production is increased and the finest quality of milk is produced.

Regardless of your herd size there is a Chore-Boy Pipeline Milking system that will milk your cows better and faster. The system will soon pay for itself in savings in time and labor — and, it will enable you to handle more cows with same labor.

Your Chore-Boy "Know-How" Man will, without obligation, help you plan your system. With his advice you will have an efficient plant, producing top quality milk, at lowest cost.

CHORE-BOY LOW-VACUUM MILKING SYSTEMS

Your Chore-Boy "Know-How" Man is more than a dealer and a service man. He has been trained to help you put your dairy operation on a real money-making basis. See him today.

Write Dept. 24 for complete information

CHORE-BOY MANUFACTURING CO., INC., Cambridge City, Indiana
Formerly FARMER FEEDER COMPANY, Inc.

Another Important CHORE-BOY FIRST

The LACTORIUM

The Chore-Boy Lactorium is a complete plant designed for the most efficient production of top quality milk—at the lowest possible cost. It consists of a specially designed, durable, sanitary building constructed in sections for fast erection on the job. It includes a complete Chore-Boy Herringbone Pipeline Milking System and all other equipment (except the bulk tank). The building is well insulated and electrically ventilated. In warm climates it may be air-conditioned. You know in advance its complete cost, which is usually less than locally built structures. You avoid delays and annoyances of building your own parlor. The entire system is built by one manufacturer, is sold and serviced by one dealer who assumes responsibility for its successful operation.

New CHORE-BOY Purchase Plan

This new plan is specially designed to fit the needs of individual dairymen. You can get up to 36 months to complete payment and during this time you are fully covered by life, fire and comprehensive insurance. Deferred payments are also available. For example, if you decide to install your milking system or Lactorium now, but will not be in full production for several months, you may delay your payments until then. You can use your Chore-Boy Milking System while it pays for itself.

Opportunities For CHORE-BOY "Know-How Men"

The use of Chore-Boy Pipeline Milking Systems is increasing so rapidly that many more "Know-How" Men are needed for sales, installation and service. If you are interested, write for an application form. Applicants who are accepted receive an intensive training course at the Chore-Boy Training Center. We help those who qualify to get into a business of their own or find employment with a Chore-Boy dealer or distributor.

This is an excellent example of a pure-bred Charolais Bull

PURE-BRED CHAROLAIS BEEF CATTLE

The largest Beef Cattle on Earth are Revolutionizing the Beef Industry

Remember the initial resistance to hybrid corn, even when it produced more corn per acre? Farmers just didn't believe it. Now most of the corn planted is from hybrid seed.

The same kind of revolution is taking place in beef cattle. Even a small percentage of Charolais blood in a beef animal results in more beef at an earlier age.

The pure-bred Charolais is so large, so big, so beefy and so fast growing, that commercial feeders look desperately for feeder cattle with even a little Charolais blood.

The way to cash in on this development is to own a few pure-bred Charolais. Then you own the factory —the means of production.

We specialize in the production of high-grade, pure-bred Charolais. We will help you get started. It takes some money, but if your credit is good, we will give you three years to pay, if necessary.

Write for descriptive booklet.

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Nation's Farmers Report on 1958 Corn Yields

5,755 Farmers from 37 States and Canada report yields which average 114.30 bushels per acre.*

DEKALB AND SUCCESS GO TOGETHER

Adverse weather always presents hazards to nationwide corn-growing contests. But, in spite of many adversities, DeKalb Corn again proved its dependability when good farmers from 37 States and Canada averaged 114.30 bus. per acre* in DeKalb's 1958 Selected 5-acre Corn Growing Contest. DeKalb Corn is Good Corn. It just has to be good to perform as it does.

DEKALB'S MAGIC NUMBER "203.14"*

Top yield in the 1958 Contest is 203.14 bus. per acre*. The championship goes to Chaswil Farms, Sabina, Ohio...John Goings, Mgr., with DeKalb 837. Reserve champ is Edward Knaub of Milliken, Colorado, with a yield of 197.72 bus.* from an irrigated field of DeKalb 409.

MANY 150 BUSHEL CONTESTANTS

It takes good farming and good seed to produce yields of 150 bus. or more per acre*, but 418 farmers did just that with DeKalb in the '58 Contest.

COAST TO COAST AND CANADA

What does DeKalb offer Northern Corn-belt farmers? Plenty! 178 Canadian farmers entered the 1958 Contest, to average 99.78 bus. per acre.* The new Canadian Champ is Robert Laing, Cromarty, Ont. His winning yield was 131.49 bus.* with DeKalb 58...a real good early.

JUST ONE BIG HAPPY FAMILY

This is DeKalb's 20th Contest year. More than 75,000 farmers have participated. Their amazing 20-year yield average is over 100 bus. per acre*...proof of DeKalb's great yielding power.

IT'S THE AVERAGE THAT COUNTS

Individual high corn yields are impressive, but not nearly as significant as when thousands of farmers with DeKalb Corn consistently make high average yields over such vast areas. DeKalb's widespread research and testing program can pay off big for you, too. Give it a try.

SCIENCE MAKES THE DIFFERENCE

DeKalb's big family of satisfied customers continues to grow. DeKalb's advanced research is one big reason. Quality control is another. For 19 straight years, DeKalb has been planted by more farmers than any other brand. DeKalb Science makes the difference. Buy Quality. Buy from your DeKalb dealer. Always order DeKalb.

*All yields were made on Selected 5-acre Contest Plots.

DEKALB AGRICULTURAL ASSN., INC.

Commercial Producers & Distributors of DeKalb Seed Corn, DeKalb Chix & DeKalb Hybrid Sorghum.

DEKALB, ILLINOIS

Sensational New CASE® 800

50 ACRES

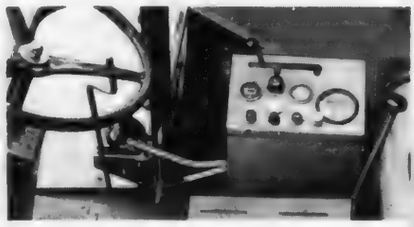
Case 800 combine, shown harvesting soybeans, adjusts easily for all grain and seed crops . . . mounts 2-row corn header.

Exclusive NEW on-the-go controls let you harvest faster . . . with FEWER STOPS

Concave clearance is easily adjusted from the driver's seat . . . lets you handle changing crop conditions without stopping. Handy concave drop-pin lets you clear the cylinder.

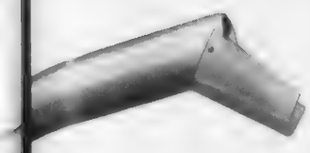
Cylinder speed adjusts on-the-go* . . . over the full range of 500 to 1300 RPM . . . without ever leaving the driver's seat.

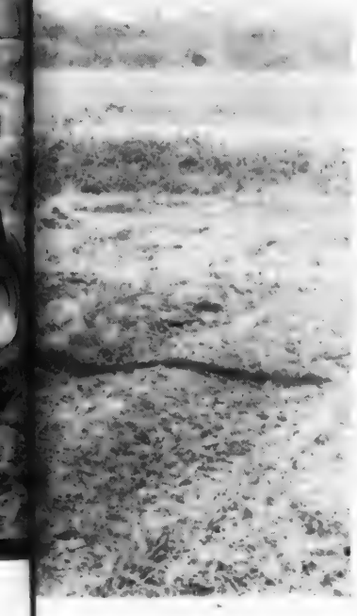
**Extra equipment*



Tachometer* on instrument panel shows cylinder speed at a glance. Lets you govern the load on the machine for increased threshing efficiency . . . harvest the most possible grain.

COMBINE Harvests
PER DAY!





Straight-through design speeds both grain and row-crop harvesting

Everything about this high-efficiency new Case combine suggests top production. Its 32-inch rub-bar cylinder (spike tooth, optional) and straight-through body are perfectly matched to 14, 12 or 10-foot headers to handle all grain and seed crops under every field condition. High-speed discharge auger unloads up to 2 bushels per second.

A new 500-stroke-per-minute sickle gives the fastest cutting action in the industry. Exclusive torsion-tube header assures a perfectly aligned cutter bar. Three-section straw walkers give fast, thorough separation; adjustable sieves and variable-speed fan give cleaner crop.

New Case 2-row corn head mounts on Case 800 combine in a minute . . . lets you pick and shell corn in one operation . . . makes your Case 800 do double duty.

For large-scale combining and custom operations, the Case 1000 with 42" cylinder offers the highest capacity in the industry . . . harvests up to 80 acres a day. Available with 16, 14, 12-foot grain headers; 2-row corn header.

See your J. I. Case dealer today for full details on these great new Case combines.

No need to wait. Case Crop-Way Purchase Plan lets you put these sensational new combines to work right away . . . make later payments as you have money coming in.

J. I. CASE

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Get the facts on BIG combine capacity

Mail coupon for illustrated catalog on Case 800 and 1000 combines. Send to J. I. Case Co., Dept. C-909, Racine, Wisconsin.

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Hog comfort and hygiene were prime considerations in the selection of these farrowing and nursery buildings at Trimble Manor swine farm near Trimble, Mo.

For the man with a long view on farming...

METAL BUILDINGS BY BUTLER

The farm factory is already here for a few farmers . . . and on the horizon for many more. This means automatic materials handling, chore handling and farm processing with power equipment.

These new methods demand new and more functional buildings, built to work hand-in-glove with power equipment. The hard way to get them is to build them stick by stick. The easy way—and the quality way is to order the Butler metal buildings you need, and simply have them assembled according to your plan.

Why Butler buildings? There are many practical reasons. Butler offers a complete range of sizes for all your shelter requirements, from a small pump house up to the largest storage barns. Butler quality construction makes the most of metals. Each part is factory precision-fabricated and sized to fit and function perfectly. Butler buildings are fire and lightning safe; rot, rat and bird-proof.

You utilize all the space you pay for. No posts inside—no matter how big the building. There's room to maneuver—room to lay out interiors any way you choose. Roofs are truss-free. Stack hay or bags right into the roof peak, or suspend bins and install overhead traveling hoists with complete freedom. Big, wide doors clear your biggest machines. Butler buildings are for the man with his feet on the ground, and his eye on the future.

Room to spare and weather-tight protection are both readily apparent in this Butler storage building at the Snarr sheep farm near Idaho Falls.

Your nearby Butler Builder is the man to see for details. Ask him about Butler financing. He's listed in the yellow pages of your phone book under "Buildings" or "Steel Buildings." Or write directly to us.

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BUTLER MANUFACTURING COMPANY

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Why is some seed corn worth 50 dollars more per bushel than others?

Sound impossible? Well, it's true. The real measure of any hybrid is in the yield of #2 shelled corn per acre. And, when it comes to yield, P-A-G Hybrids are better today than ever . . . farther ahead of other hybrids than ever before. How do we know? Over 15,000 individual yield checks, each witnessed and certified, prove it.

Here are the facts: These comparative yield checks were made side-by-side in farmers' fields. The results: Genuine Pfister Hybrids out-yielded the average of all other major hybrids by nearly 50 bushels for each bushel of seed planted. This means that every bag of P-A-G is worth as much as $50.00 in extra profit for you.

That's the real difference P-A-G quality makes. Plant it this spring. Run your own yield check. You'll see why P-A-G is *the most famous name in corn.*

Genuine Pfister P-A-G PFISTER ASSOCIATED GROWERS, INC.

THE MOST FAMOUS NAME IN CORN

Pfister Associated Growers, Inc.

GENERAL OFFICES: AURORA, ILLINOIS

PFIZER ANNOUNCES

NEW WAY TO CUT BEEF PRODUCTION COSTS!

TRAN-Q®

AN ENTIRELY NEW KIND OF FEED INGREDIENT —UNLIKE ANY YOU'VE EVER USED BEFORE!

- **Boosts gains by up to 27%...**
- **Feed efficiency by up to 23%...**
- **Profits by up to $11.13 per head!**

Here's an entirely new way to cut your cost of producing beef that can net you three, five, ten, or more extra dollars for each animal you feed out.

It is not a hormone-like substance such as stilbestrol . . . not an antibiotic or a replacement for any other feed ingredient. Tran-Q is an entirely new kind of feed ingredient—unlike any you've ever used before.

A block-buster of a gain booster

Tran-Q is a unique member of the tranquilizing drug family that has been undergoing extensive feeding trials for several years by Pfizer and feed industry scientists.

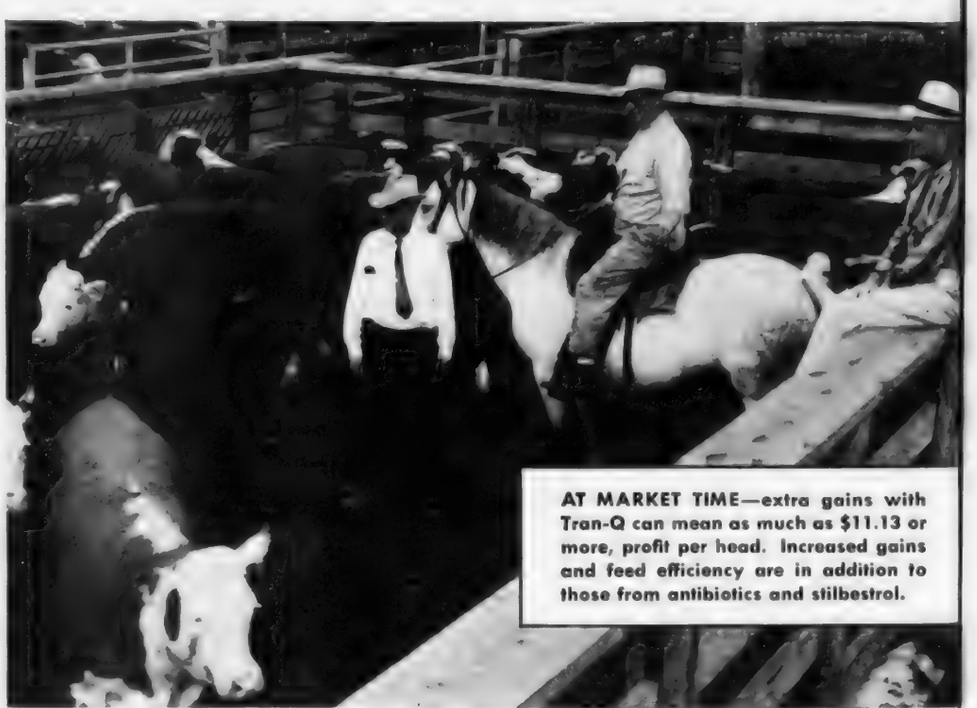
Trial results show feeds containing Tran-Q boosted beef gains 6% to 27% with an all-trial average of 12.4%! Feed efficiency improvements ranged from 5% to 23% with an all-trial average of 10.2%.

The average extra-dollar return per head added by Tran-Q was $6.44 per head over and above its cost.

The extra gains and improved feed efficiency you get with feeds containing Tran-Q are not available from any other feed ingredient.

For example, in one 84-day trial, Tran-Q produced 12% improvement in rate of gain and 7% improvement in feed efficiency in addition to the extra gains from Terramycin® and/or stilbestrol.

®TERRAMYCIN BRAND OF OXYTETRACYCLINE



AT MARKET TIME—extra gains with Tran-Q can mean as much as $11.13 or more, profit per head. Increased gains and feed efficiency are in addition to those from antibiotics and stilbestrol.

Spectacular results with sheep, too

In work with lambs, feeds containing Tran-Q have given improvement in rate of gain up to 42% and up to 22% improvement in feed efficiency.

The average dollar return per animal over controls was $0.87 over and above the cost of Tran-Q based on feed prices at time of tests.

Arrival day to marketing day

Improved growth response and feed efficiency are obtained with feeds containing Tran-Q *throughout the entire feeding period!*

For complete details, ask your feed supplier about this new way to cut costs.

Pfizer

Chas. Pfizer & Co., Inc.
Brooklyn 6, N. Y.
Science for the world's well-being

Send Your Hay AIR BALE... SPECIAL DELIVERY

John Deere Automatic Loading and Storing *Speeds Work . . . Cuts Costs*

There's no room for "slow freight" methods on today's farms! John Deere's revolutionary One-Man Hay Handling System speeds work . . . eliminates drudgery . . . reduces man-hours . . . and cuts costs. It not only increases your efficiency of operation, but also gets better hay in the barn.

Whether yours is a family-sized farm or a large-acreage operation, a John Deere Twine-Tie Baler with Bale Ejector and a Portable Elevator with Barn Bale Conveyor will cut your hay-handling costs by 50 per cent.

Can you really afford *not* to make these savings? Better see your John Deere dealer soon. Mail coupon below for free information.

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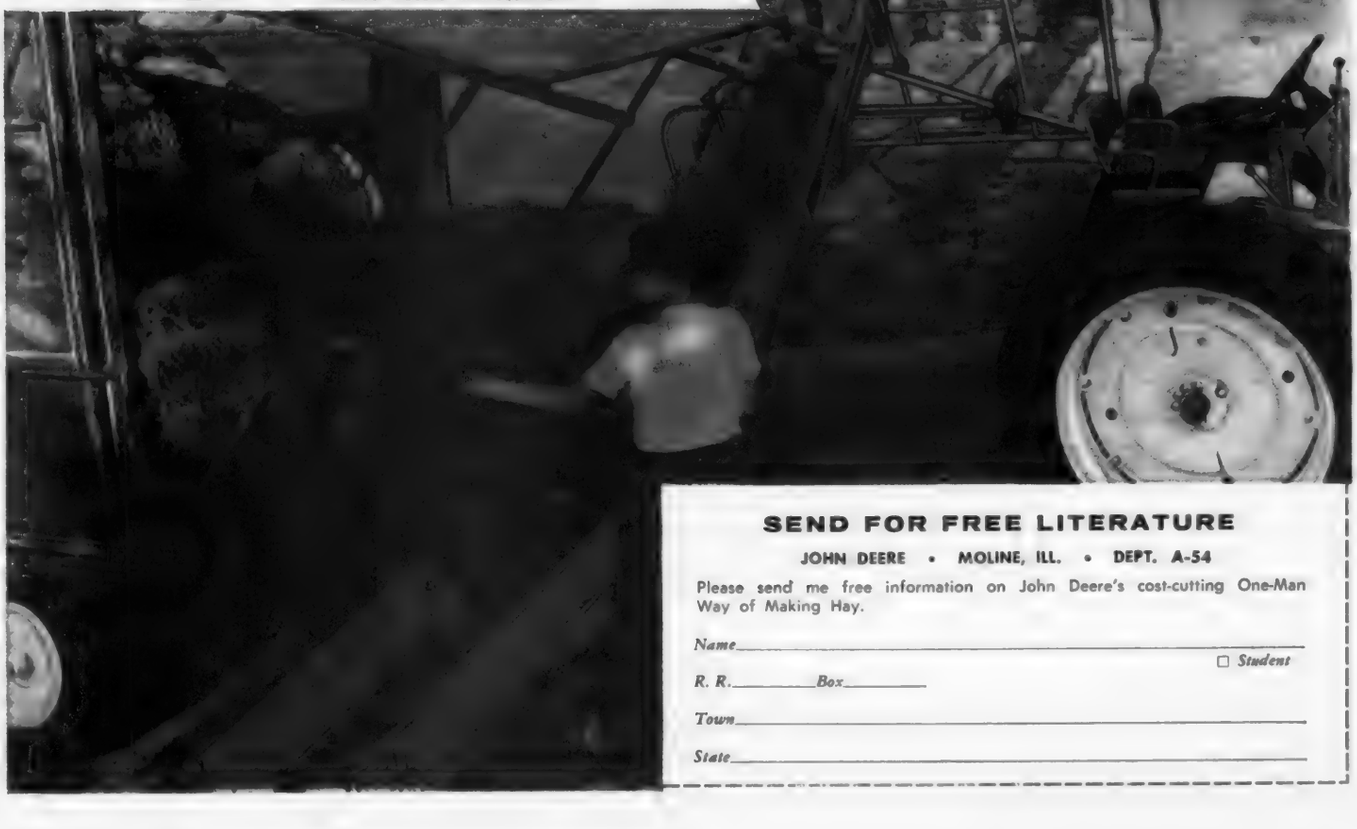
"WHEREVER CROPS GROW, THERE'S A GROWING DEMAND FOR JOHN DEERE FARM EQUIPMENT"



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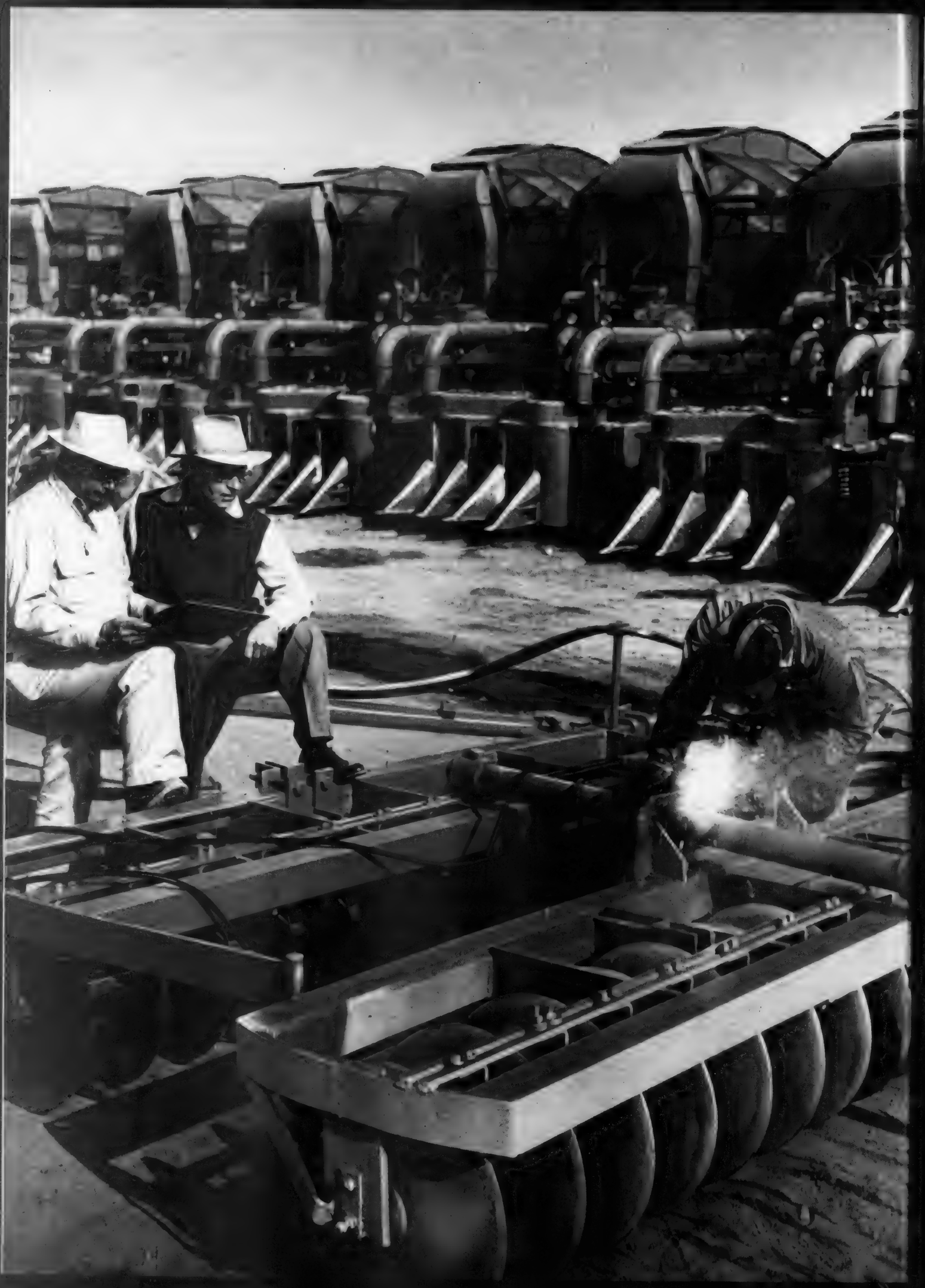


the Bill Camp Story

A South Carolina farm boy, now Mr. Cotton of California, took cotton out of the South to the West Coast.

By J. M. Eleazer

WOFFORD BENJAMIN CAMP wiped the red Carolina dust from his eyes. The cotton rows, even on his father's small patch, seemed endless and the weeds as thick as the hair on a hound's back. But young Camp allowed himself only a small breather. He was going to college in the fall, and he needed every penny of his share of the crop. He was going to college to learn more about cotton, more than he could learn from the blister end of a hoe.

And Wofford Benjamin Camp did learn about cotton. He knew planting and chopping and picking almost from the day he could walk; he learned plant breeding and selection in college.

I first knew him as a freshman at Clemson College. Even then he knew more about cotton than some of his professors. He seemed to have been born with the knack of managing cotton, and this, combined with his college learning, has made him one of the leading cotton scientists of the world, one of the biggest cotton farmers in California, and the hero of a rags to riches story that not even Horatio Alger could equal.

Somewhere along the line he picked up the name of Bill, and Bill he is today to his newest Mexican laborer or to the Secretary of Agriculture. He is "Mr. Cotton of California," for it was he who adapted the South's cotton to the Coast, showed the westerners how to change from cattle to cotton, how to irrigate cotton, and more than any other man was responsible for the migration of cotton to the far west.

He is a rich man today; how rich he doesn't even know himself. A good portion of the great dream he had that summer before he went to Clemson College has come true. What were the qualities that set him apart—a rare man who could fashion an empire out of the parched sand of a California desert, and change the face of California farming?

To find out what manner of man Bill Camp is we could go back to that little farm in the rolling red hills of up-state South Carolina.

It was a small farm and there were no hired hands—every member of the family pitched in at chopping and picking time. Chopping cut the school year short in the spring, and picking in the fall. Bill took his schooling out of what was left. By the time he was college age he had just finished the eighth grade.

He doesn't remember when he first decided to go to college. When he was about half as tall as a hoe handle his father gave him a patch where he planted some truck and melons. He worked his patch with a bull yearling, Black Joe, and his own muscle. He peddled his produce from door to door in Gaffney, the nearest town, and the money went into his college fund. When he had finished the eighth grade and was old enough, if not schooled enough, he de-

Left, Bill Camp and his shop foreman, Henry Jordan, watch a job of welding. In the background, part of Camp's quarter million dollars worth of two-row cotton pickers.

Below is the Camp family when Bill was young, back on the old home-place in South Carolina. Bill, the youngest, stands next to his mother. Bill now owns this farm, grown to 3,000 acres.

Below, Bill checks staple length of a cotton sample—breathes on it to soften, separates fibers, measures samples on his sleeve. A natty dresser, this is typical of his everyday appearance.

Irrigating a seed alfalfa sowing on Bill Camp land. On the horizon is a portion of the Kern-Friant canal. The hand-manipulated timbers aid in even water distribution. These Kern County fields produce the finest alfalfa seed in the world, are rented for pasture to sheep men after the seed is harvested.

cided to make the break for college. His savings weren't even enough to see him through the first year, so he applied for a scholarship. There was a catch in that, too. He flunked the examination, which wasn't designed for an eighth grader, but fortunately for him everybody else who took the exam flunked, too. Local friends prevailed upon the college to give him a chance, conditional on acceptable work, for one year. Bill rarely had his nose out of a book that first year, but he passed with good marks. His scholarship was renewed.

We were often in the same classes those four years and I had a chance to know him well. Courage and tenacity of purpose was written in everything he did. I remember that in our botany class one day a practical joker squirted a dropper of methane blue down the back of Bill's neck. We had an unwritten code that differences of opinion of an aggravated nature were settled back of the dorm after supper in the evening. Bill and the joker fought it out in one of the greatest battles in the annals of Clemson College. Both were bloody and so tired that they leaned on each other, like a couple of exhausted roosters. The fight was a draw, one of Bill Camp's few struggles he hasn't won.

When Bill finished college in June, 1916, he had, literally, only the clothes on his back. But he did have a vast knowledge of cotton—he knew it from the soil to the bale on the farm, and he knew it from the laboratories of Clemson College. He needed a job, and he wanted a job in cotton. The College authorities recommended him to one of the DuPonts, who owned coastal lands in South Carolina and wanted to find some crops suited to the vast abandoned rice lands there. One of the things Bill tried was cotton, long staple cotton, on Combahee Plantation.

The famed Sea Island Cotton industry of Coastal Georgia and Carolina had all but been destroyed by the boll weevil, and a variety to replace it was needed. So, in cooperation with USDA and Clemson, he put out extensive cotton plots there that year. The most promising variety in that test was called Acala, a cotton USDA had found in Mexico and on which a little work had been done in Texas. It was earlier than the late-growing Sea Island variety.

War was brewing in Europe, and long-staple Sea Island cotton had become essential for airplane fabric, tires, and other war uses. Officials of USDA prevailed upon Bill to go west and search for a place where suitable long-staple cotton could be grown. So he gave up his work at Combahee Plantation and went west.

Bill had little encouragement from officials in Washington. They told him cotton couldn't be grown in the Far West; it had already been tried. But Dr. Taylor of the Bureau of Plant Industry had faith that it could, and he prevailed upon Bill to go and try it anew.

He finally landed in Bakersfield, California, in time to make trial plantings in the spring of 1917. But he was a lonely man on a distant shore. California wanted none of cotton, "a poverty crop." He traveled around, by train and by foot, planting his test plots. He met H. A. Jastro, manager of the giant Kern County Land Company, who gave him permission to use company land on the edge of Bakersfield. At Fresno, W. T. Nutting, father of the famous Thompson seedless grape, who saw the need for another crop to take some of the

gamble out of the grape business, also turned over some plots for Bill's plantings. Mr. Nutting bought an old Ford car and gave it to him for his work, and from there on, Bill was ready to ride.

The San Joaquin looked good to Bill, but when he made the long trip to Berkeley to lay his plans before the Dean of Agriculture, he was told flatly, "Cotton won't grow in the San Joaquin Valley. And even if you could grow it, you couldn't get it picked, for no one does that but Negroes." The Dean seemed surprised when Bill told him white folks, too, picked cotton in Carolina, and that he himself was the cotton-picking champion of his home county of Cherokee, with 353 pounds picked in a day. But the Dean insisted it was specialty crops they wanted in California. "Cotton will ruin the economy of any area, socially and economically," he concluded.

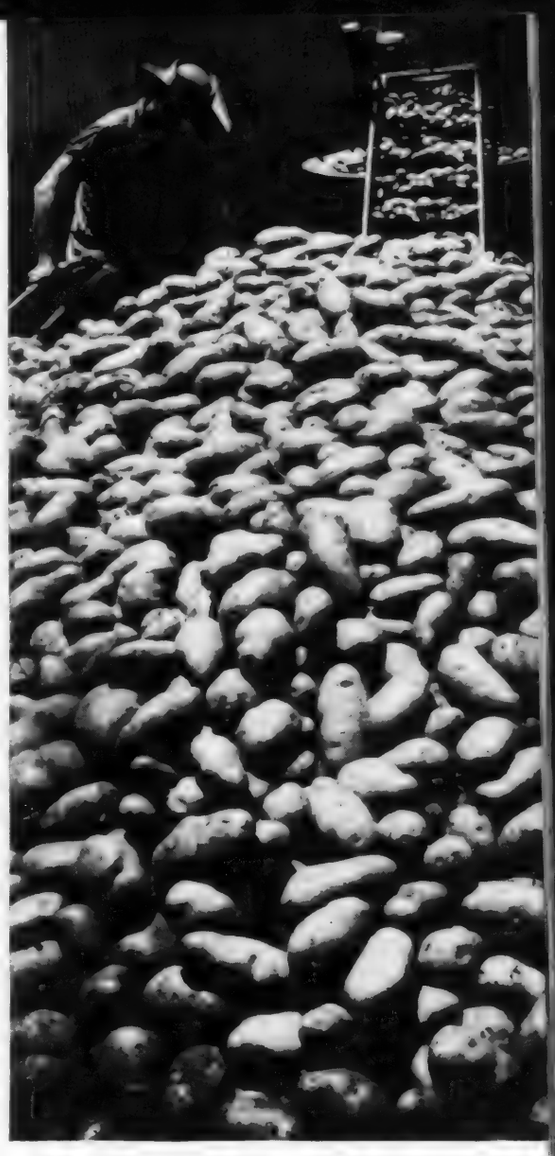
But the Kern County Land Company warmed up to Bill's plans and they agreed to help him centralize his tests. They offered 80 acres of their holdings anywhere he would select it. With soil auger in hand he roamed the desert lands and finally selected an area near Shafter. The county took deed to it and leased it to the Government and it is now the famous Shafter Experiment Station. Bill supervised the drilling of the irrigation wells and leveling land. He ran the station for many years.

In his early trials of cotton there in the San Joaquin Valley, Bill tried out various sorts. Egyptian was the first variety planted on the farms. It brought a very high price at first, due to war restrictions. When they were removed, the price plummeted below cost of production. Bill's work had shown that the Acala that had looked best in Coastal Carolina was proving to be the consistently high yielder out there. And when the high differential on Egyptian cotton was removed, they could make money growing a slightly shorter, high-yielding staple and Acala was settled upon.

In 1925, with considerable backing from the growers, Bill spearheaded the fight for the one-variety cotton law that is still in operation in most of California. Under it, only the variety approved by USDA, the Shafter Experiment Station, and its committee of growers can be planted in the San Joaquin Valley. Thus, with no mixing, the work of the breeders at Shafter can grow into maximum fruitfulness in the field. The station furnishes the basic stock of seed. This is carefully multiplied by their farmers' seed organization and top-quality certified planting seed of the same sort is supplied to all growers at a cost not much above the oil mill price for which they sold their field-run seed the fall before.

It was while at the Shafter Station that Bill began to do a little farming on his own. He had saved a little money, and land that now sells for $1,000 an acre could be bought for a tenth of that price. He bought a quarter-section, leased more, and borrowed money to put down wells. He kept an eye on his own operations from his position at the Station.

He seemed to have a magic touch when land and cotton came together. In 1929, the Bank of America, which had taken over thousands of acres as casualties of the agricultural depression, offered Bill a job as manager. He found farmers with fruits and other specialty crops were going broke fast. But those with cotton were holding on to such an extent that the bank could afford to carry most of them. He counseled with hundreds of these farmers in trouble and in many cases helped them work out a more stable program that included some cotton, too.



Bill Camp has a just right to a second title, Mr. Potato of California. Part of a daily run of 80 carloads (above, right) comes out of the sorter and washer. Below, a scavenger band of sheep cleans up after the alfalfa seed harvest. Camp rents the pasture to sheepmen; the birds follow the sheep for the tick feast.

After five years with the Bank, Bill was drafted to go to Washington in the early and hectic days of the New Deal as assistant director of the cotton section of the Triple-A under his friend, C. A. Cobb of Georgia. There he helped wrestle with the stupendous task of administering the cotton plow-up and control program.

At the end of 1936 Bill gave up his work in Washington and returned to Bakersfield, a sadder and wiser man. He had seen Red fringes in Washington official circles, and he didn't like it. From that experience Communism became anathema to him and was to color his thinking to this day.

Back home in Bakersfield, Bill Camp began his swift climb to success. I have often wondered from whence came the source of his stupendous energy, and "how one small head can hold all he knows." He is a stocky man, a little under average height, a dapper

dresser, and he doesn't look his 65 years. He talks and acts like a successful small-town grocer; it is when he is in action that one sees the true caliber of the man. He knows exactly what he is doing, knows what he wants done, and how he wants it done. He once said to me, "In an emergency, any intelligent, quick action is better than delay."

Mild and gentle and always courteous, he built his cotton kingdom without brutality and ruthlessness. He has helped others as thoroughly as he has helped himself, working on many service groups without pay.

He has a way of being right, a sort of sixth sense about the future. He runs his shrewd blue eyes over a piece of land and sees the crop growing, the wells flowing, and the harvest. His capacity for remembering every detail of an operation is amazing.

The first quarter-section of undeveloped desert Bill bought in the mid-twenties was the first land he ever owned. It was mortgaged and he had no money for the wells he needed. He did what had rarely been done before—he set a precedent when he convinced a California banker that a loan to dig a well was a good investment. There was no dwelling on the place and Bill put up one of the most ingenious homes in California, five discarded refrigerator cars which he bought for $25 each. He knocked out walls, built a gabled roof, windows, and doors, and decorated the interiors. They made a very attractive home—one of Bill's sons lives there today.

He bought up land as it came on the market, and leased a good deal more. He has always leased land—bought it later if the price was right and it proved out. He very early saw that diversification was a form of insurance he could not afford to pass up. While his first love was cotton, he soon got into potatoes in a big way, and from time to time other crops—cattle, alfalfa, onions, grapes, and sugar beets.

No one knows, because he refuses to discuss such things, how much land he owns, how much he leases. Some indication of the cotton acreage is the number of mechanical pickers in operation—I saw 17 pickers in one field, turning out 200 bales in one day, the work of 1000 hand pickers. And he did hire 1000 pickers, mostly Mexicans, at one time—hired them to pick up potatoes and held them over for the cotton. Everybody knows Bill Camp as "Mr. Cotton of California." He has a genuine right to another title, "Mr. Potato of California." During the six weeks of the potato harvest, 30 to 80 cars a day roll from his sheds.

He has not confined his land holdings to California. A man of sentiment, one of his first buys after he got rolling in California was the old home-place in Cherokee County, South Carolina, about 100 acres to which he has added more than 3,000 acres in the same area. He owns the famed Buckfield Plantation on the Carolina Coast where Kress, the 5 and 10 man, used to grow his bulbs. There are 11,000 acres in this plantation, which Camp turned into a cattle operation. He spends considerable time in Carolina and would like to think of it as his home. The Wall Street Journal recently quoted him on the "state of the nation." "W. B. Camp, Sr., a cotton farmer and self-styled 'South Carolina Democrat', is 'afraid we're spending ourselves right down the drain.' "

In addition to his cotton, potato and cattle operations, Bill finds time, no one knows where, to serve on innumerable committees and service groups. He is a member of the Potato and Cotton Commodity Committees in Washington, and helped organize and is presently a member of the California potato and cotton committees. For six years he has represented agriculture as director of the U.S. Chamber of Commerce and is now vice-president of that organization. He has known personally the Secretaries of Agriculture since the 1920's and is regularly consulted by the Department.

He has holdings in banks and industry. Only a human dynamo could carry this great load, but he has always had help. His first wife was an exceptional woman who worked with him in the early years when the going was rough. She died when their two sons were in the service in World War II. The two sons, chips off the old block, are taking more and more of the administrative load off their father. They have holdings of their own, but the main operation of the Camp family is W. B. Camp, Inc., which promises to be a very enduring organization.

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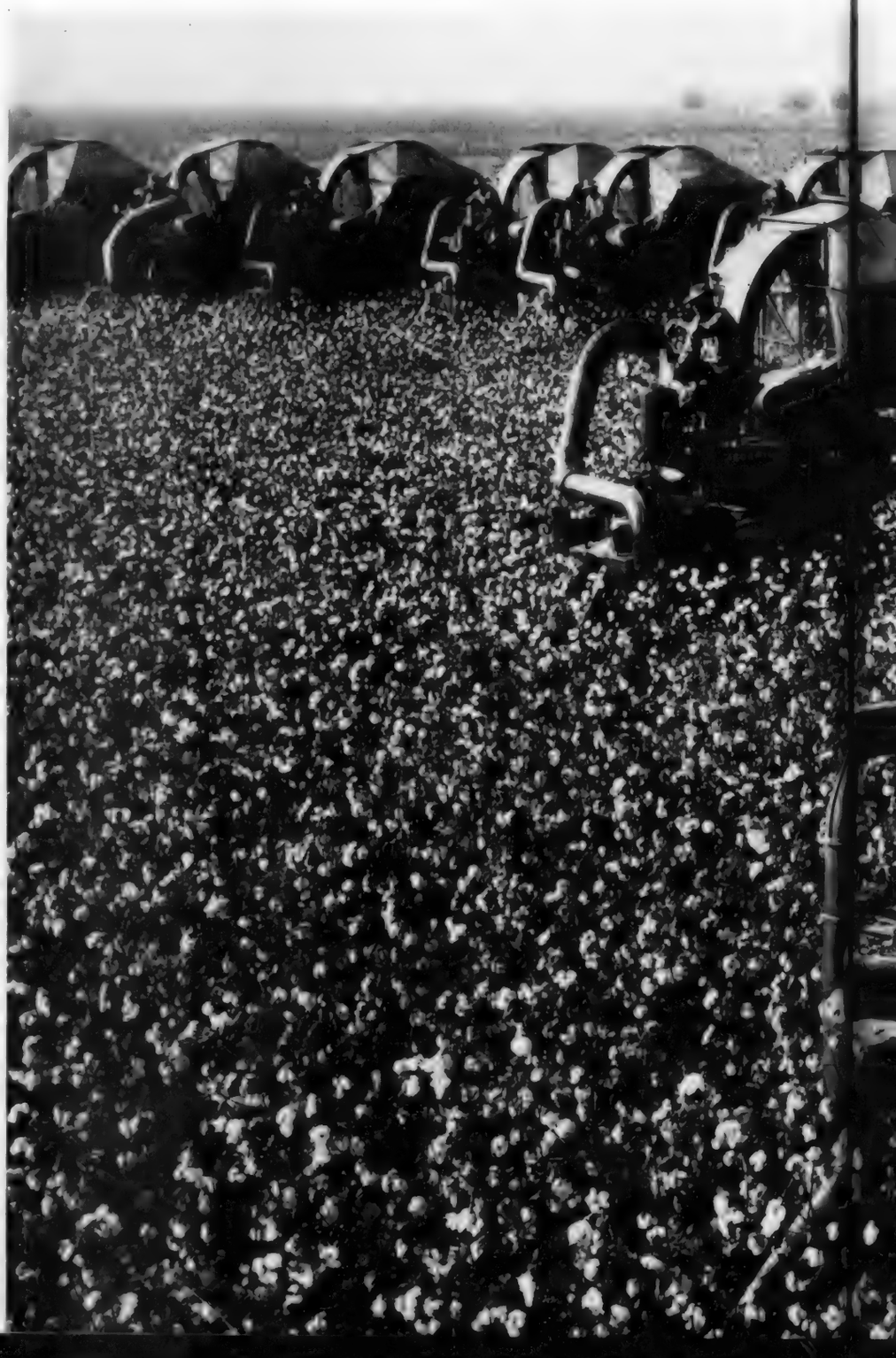

A king without a throne—Bill has no desk in the farm office, must stand when he confers with his two sons, Bill, Jr., far right ; Don, left. Here they are actually talking over a deal involving almost half a million dollars. Below, sixteen Camp cotton pickers in one field, turning out more than 200 bales in one day. The cotton is Acala.

Farmers are finding a profitable market for game birds sold on the wing.

By George Laycock

Hunting as a Cash Crop

In 1958 an estimated 15,000,000 hunters in the United States trudged across fields, pastures, woodlots, forest and mountains stalking and shooting everything from doves to grizzly bear. Most farmers permitted hunting on their land, a few would gladly have shot the hunters, and around 1,200 welcomed the hunters and made a killing of sorts. These were the operators of farm hunting preserves.

Even though farm hunting preserves have been increasing in numbers at an accelerated pace and have been doing a good business, fewer than five per cent of the hunters last year were shooting on preserves. There are those who expect this figure to climb to 50 per cent eventually and for the number of preserves to increase a thousand per cent.

All this promises a new type of farm business. And many landowners are speculating how they can cut in on a piece of it.

There are good reasons for the growing popularity of preserve shooting. Land open to free hunting has been steadily giving way to spreading cities, industrial sites, and highway systems. At the same time the number of hunters is increasing with the growing population.

In recent years state after state has passed special legislation giving lawful status to this game bird type of agriculture. Thirty-eight states now permit the operation of commercial shooting preserves and others are certain to follow. Meanwhile, the advances of poultry science have taken some of the risks out of raising the birds needed to stock shooting preserves.

Many farmers who have signed up with the conservation reserve of the soil bank have been interested. But, unfortunately, no land in the conservation reserve can be used as a commercial shooting preserve, according to the USDA.

How It Works

Harold Hollister, an able operator in this new farm field, farms 368 acres in the center of rich corn and hog country. Four years ago he turned it into a shooting preserve. Since then business on his Ohio Cherry Bend Pheasant Farm has grown steadily. And his operation, in many ways, is a typical one.

The hunter who wants to shoot on Hollister's place phones in his reservation two or three days in advance. At the farm he gives Hollister $15 and in exchange is permitted to shoot three pheasants. More shooting costs him $5 for each additional cock bird and $3 for hens. In Ohio, as in most states, the hunter needs a state hunting license before he can shoot on a commercial area.

Last year Hollister released 17,000 pheasants hatched and reared on his farm, in the September 1st to March 15th shooting period permitted by state law for commercial preserves. The wild crop of pheasants on the place, of course, wouldn't begin to fulfill such a demand for birds. During 1958, which was a good year for wild pheasants, shooters on Hollister's farm bagged only 45 wild, unbanded pheasants, which Hollister had to make good to the state by releasing 45 home-raised pheasants outside his farm borders. He also pays the state a $100 annual preserve license fee.

Pheasants are Hollister's cash crop. He produces about 100 acres of corn, but leaves a large part of it standing as protective cover for birds. The rest is picked and turned into pheasant feed.

Enough birds are released daily on Hollister's farm to supply his hunting parties. He figures his shooters recover about 80 per cent of the pheasants released. Some of the remaining ones wander off the farm.

Eighty per cent, as any preserve operator will testify, is an excellent rate of recovery. One reason is the group of nine good bird dogs he keeps. Shooters can take the dogs into the field without added charge. Hollister, unlike many operators, does not send a guide and dog handler with his hunters but lets the customers manage the dogs themselves. He employs only two hired hands on the farm.

In addition to operating his shooting preserve, Hollister holds down a full-time industrial job. Some shooting preserve operators own the land and some lease it. Some who don't own enough land for a shooting preserve, lease additional adjoin-

Hunters are welcome in the farmyard of Mel Cochran (left). Cochran's Cairn Covert shooting preserve covers 250 acres near Morrow, Ohio. The hunters pay $10 to shoot two pheasants; $3.50 for additional birds. Before taking to the fields, Cochran (above left) briefs the hunters on the farm boundaries using an aerial photo-map. He buys pheasants from game farms and releases them the day of the hunt. Hunters either bring dogs or use Cochran's and he usually goes along as a guide. The shooting preserve is a sideline when farming is slack.

ing land. And some are farmers who still carry on most of their regular farming operation, but have added bird shooting as an extra enterprise.

Fanciest of all shooting preserves is the 5,000-acre Fairway Farm Hunt Club at San Augustine, Texas, which draws its clients mainly from petroleum companies. This club raises 40,000 pheasants and 20,000 bobwhite quail a year and releases some ducks and other game. For good measure it provides its customers with an 18-hole golf course, swimming pool, tennis courts, horseback riding, trap and skeet ranges and fishing. There is a guest lodge on the grounds and a 3,800-foot runway where the 100 members may land their planes.

Basic Requirements

Any farmer who considers opening a shooting preserve faces some important questions. Is his farm close enough to centers of population? Is it the right size? What services, in addition to game birds, must the operator furnish? What farming operations will be necessary?

Several organizations have studied what makes a shooting preserve successful. And, because they sell shells or guns or game birds, they are more than willing to answer the detailed questions.

For example, the Sportsman's Service Bureau, established by the Sporting Arms and Ammunition Manufacturers Institute at 250 East 43rd Street, New York City, runs a consultant service for shooting preserve operators. Their specialists have studied preserve operations in all parts of the country and evolved a set of suggestions for interested people.

The first step is to learn the regulations

Mel Cochran (above) uses a hand net to snag a pheasant from the holding pen He made the pen by screening in an old barn with light chicken wire fence.

Cochran (above) like most preserve operators, gets a high rate of return by stocking pheasants on the day of the hunt. Pheasants revert to the wild immediately and provide hunters with difficult shooting and high quality meat when hit.

These well-fed mallards (below) are creatures of habit. They are trained to walk up the ramp and fly from the tower past hunting stations to a farm pond. The survivors are driven back at the day's end for feeding.

in your state. The laws vary, but you can learn them from your state conservation agency or your county game protector, or by writing to the Secretary of State of your state.

The best location for a shooting preserve is within 40 to 50 miles of a large population center, as most customers come from cities of over 50,000 population. But some preserves 100 miles or more from large cities can get along—at least until someone opens a preserve nearer town.

Next take a critical look at your farm. It should be neither too large nor too small, something between 300 and 500 acres is ideal. Some are smaller, even as small as 100 acres, but business may outgrow acreage and limit income on such a tract.

One good reason for keeping the preserve under 500 to 600 acres is that a moderate acreage well cared for is better than a large acreage loosely managed.

The land should make comfortable hunting for customers. Preserve shooters are often older hunters or office workers who prefer bagging their birds without wading a swamp or climbing a mountain. The best terrain is flat or gently rolling. If there are natural features that box in your area, you're doubly lucky.

One of the best examples of fitting a preserve to the landscape is the Mardel Pheasant Preserve near Milton, Kentucky. Here fertile river bottom lands a half mile wide make easy walking for hunters, and birds are walled in on one side by the broad Ohio and on the other by high, steep hills, a natural barrier to pheasants.

Large woods or swamps not only make hunting difficult but also enable expensive birds to escape too easily. Pheasants are farmland birds and do their best in agricultural surroundings.

You start to ensure a good recovery rate the year before you liberate birds. To combine cropping and pheasants, plant your crops in alternating strips of legumes and grain crops. You may have to do away with fall plowing because hunters and birds will use the cover strips and meadows in fall and winter.

On Nilo Farms, a shooting preserve demonstration area at Brighton, Illinois, cover crops are planted in strips 10 to 50 yards wide and 50 to 100 yards long and land around these strips is kept bare or close clipped to make barriers for the birds. Pheasants, which habitually run before the hunter or dog, seldom venture into clean regions; this makes it easier for hunters to find the birds and get them to fly. Lespedeza and sweet clover spring seeded into the grain crop makes excellent protective cover for birds.

Food patches are important on the game preserve, too. These supply bird cover as well and, according to the Nilo farm people, they should measure from an eighth to a half acre and there should be one every four or five acres. If the patch is big enough it should be divided and half planted to

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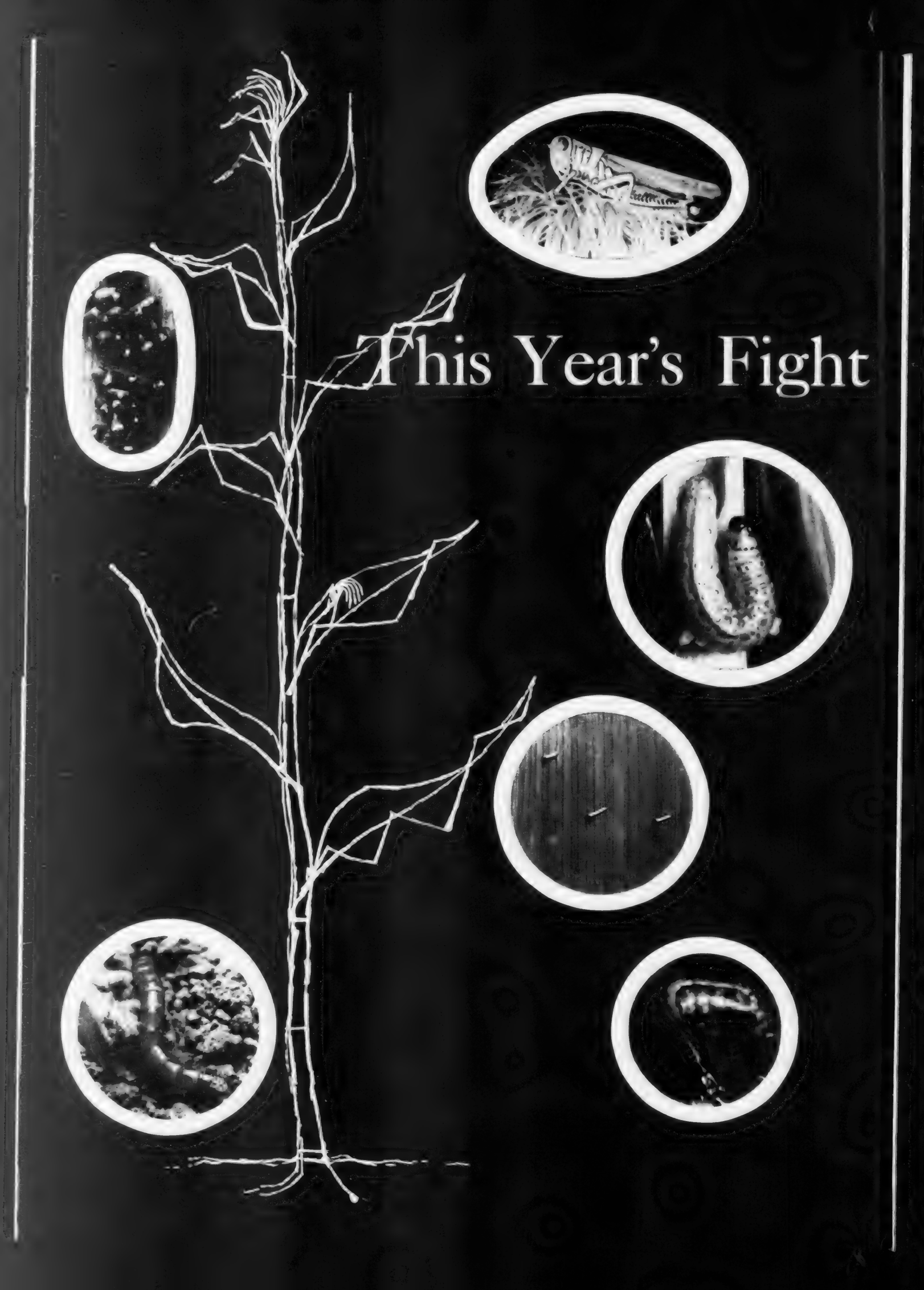
The colorful ringneck pheasant flushing from the field border (above) is the bird that brings great numbers of hunters to the shooting preserves. This one took to the air when the dog came in from the far side and forced the bird onto the cleared strip. Bobwhite quail (right) are popular shooting preserve birds—especially in the South. One operator, Mike Moneymaker, of Lawrenceville, Georgia, raises several thousand annually; charges $25 a day with a 12-bird limit. He keeps hen quail in miniature laying cages and incubates the eggs. Quail, unlike pheasants, are released two weeks before the area is hunted to accustom birds to the wild.


This Year's Fight

By Grant Cannon

on Bugs and Weeds

WINNING THE BATTLE against bugs and weeds is part of the job of growing corn. The farmer is on the firing line in this endless fight, but he has staunch allies. In the Grand Alliance, called Agribusiness, there is a chemical warfare section constantly supplying him with new weapons. They, the scientists in colleges, experiment stations, and chemical companies, are constantly scouting the enemy to discover weaknesses and points vulnerable to attack.

This year, the farmer's odds in this battle are better than ever before. His arsenal is improved by an expanded use of Endrin against insects, and the granting of a label for Simazine, one of the most highly selective weed killers to be put on the market. The authorization for use of these new chemicals came last year, too late for general distribution. He is also strengthened by the increased use of granulation in formulating both insecticides and herbicides. This gives him greater versatility in applying the material.

The battle with the insects begins before the corn pokes its head above the ground. Underground it must survive against the attacks of the voracious wireworms which will eat the seed, the emerging plant, or the roots of the maturing corn. Its roots may also be grazed on by the thin, wrinkled corn rootworm and the fat grape colaspis larva, the latter particularly if the corn follows lespedeza or clovers. The seed may be eaten by the seed corn beetle or destroyed by the sharp-nosed seed-corn maggot or the growing plant chopped down by the destructive cutworm.

With such a formidable enemy order of battle, most entomologists in the Corn Belt recommend an annual soil treatment before corn planting as an insurance against these destructive pests. They point out that an increased yield of around two and a half bushels of corn will pay for the treatment and this, they claim, soil treatment will usually achieve. Some years it may save the whole crop or a replanting of the crop.

J. H. Bigger of the Illinois Natural History Survey staff has conducted a five-year study on hundreds of fields of corn to test this belief. He has found that in careful tests the practice paid off 67 per cent of the time—25 per cent of the fields showed a return 3 times or more the cost of treatment; 18 per cent gave a return twice the cost of treatment; and on 24 per cent of the fields cost and return broke even. In 33 per cent, the increased yield did not quite pay the way for the treatment. The catch is, however, you can't say which fields might be safe. You *can* say which fields should certainly be treated, however. Bigger recommends soil treatment on (1) fields in continuous corn or in corn for two successive years; (2) fields with a history of loss from soil insects; and (3) fields which were in sod or legumes the year before. In fields sowed to continuous corn the northern corn rootworm, if not fought with insecticides, will change from an enemy infiltration into an invasion threading its way into the larger roots and also carrying bacterial wilt disease. Fields with a history of insect loss usually will be found to be infested with wireworm—usually in the low spots.

Soil treatment can be done before or during planting. Any time in the spring after plowing, either aldrin or heptachlor can be sprayed or broadcast in granular form over the field at the rate of one and a half pounds of actual chemical to the acre. The chemical should be disked in immediately after it is put on the soil. When used in the row at planting time, either chemical is applied at the rate of one pound per acre. An ordinary field sprayer with hose leads mounted on the openings normally connected to each section of the boom can be used to spray into the row. A nozzle is attached to each hose and mounted so it sprays in the soil in the planter shoe rather than on the seed. Granular insecticide is used at the same rate, one pound of actual chemical per

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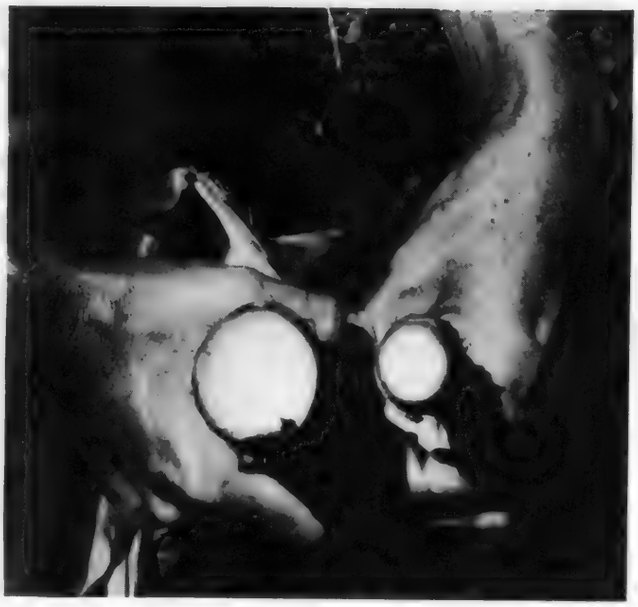
These are the enemies farmers must fight to raise a corn crop. Reading clockwise, starting at 7 o'clock, the wire worm, a voracious creature which eats the seed, the sprout, and the roots of corn; chinchbugs which migrate from small grain to corn on foot and which may be stopped with a barrier; the grasshopper, another enemy which may be destroyed with a small amount of spray if caught early; the full-grown corn borer and, below it, three newly-hatched borers, which can best be attacked with granular insecticides; the fall army worm which migrates each year from the south as a moth.

This Year's Fight on Bugs and Weeds

The arsenal of chemicals the farmer has to throw at insect and weed enemies this year is formidable. In addition to a wide choice of chemicals, the farmer may choose most of them as either granules or sprays. Each formulation has its advantages. Sprays do a better job where the whole plant must be covered and provide excellent distribution for pre-emergence weed treatment or for fighting soil insects. Granules generally have a longer useful life; are less irritating to the skin and less dangerous to use; drop well into the leaf whorl for fighting corn borer; and make a lighter load and do a better job of falling on the target when dropped from a plane.

One of the insecticides newly released for use against corn pests is Endrin. This organic hydrocarbon is extremely powerful (it is applied at the rate of two-tenths of a pound per acre) and has a long residual life. It can, however, be used on corn 45 days before the crop is cut for silage.

A new weed killer is Simazine which is almost completely selective—it kills all broad-leaved plants and all grasses except corn. It needs water within ten days of application as a pre-emergence spray to do its best job. Crops planted too soon after the corn may be damaged.



The thick stalk of the dwarf corn shows why this short hybrid lodges less than the thin, tall corn.

dwarf corn

By Chester Charles

Some dwarfs produce yields comparable to regular varieties in both grain and silage; dwarf varieties have better standability.

dwarf corn

Short, thick-stalked corn, called a brachytic dwarf, is a new and exciting development. It has as many nodes and leaves as normal corn, but they are much more closely spaced. Its stalk runs two or three times the diameter of regular corn. It is planted and cultivated the same as normal corn and requires as much water and fertilizer. Its yield is slightly less—though surprisingly high yields of silage have been recorded. Its major advantage is its ability to stand in wind and weather that lodges tall corn. Plant breeders feel yield and disease resistance can be improved considerably.

DWARF CORN has always been with us. Until recently, it was given scant attention. A stunted normal hybrid is not a genuine dwarf; dwarf corn is a distinct breed. Last season, interest mounted in what had formerly been considered freak corn. This year, thousands of acres will be planted with dwarf types. Some farmers will find them excellent; other farmers are going to be disappointed.

Why grow dwarf corn? Lewis M. Camp, corn breeder for Pfister Associated Growers, said, "The jokers around the hot stove will tell you dwarf corn is for feeding dwarf cattle to get condensed milk. That may be funny, but not fact. Dwarf corn is not just stunted or small corn. The stalk is more compressed and fewer of the brace roots grow above ground than with normal corn. This gives it greater structural strength. It stands up where other corn goes down."

The dwarf corn hybrids now under wide experimentation are of two types:

(1) Reduced types. These are sometimes referred to as miniature corn. When compared to standard hybrids, stalk height and leaf area, as well as ear and kernel size are smaller. In a few cases, fair yields have been reported where plant population has been greatly increased. This is the kind of dwarf that has been planted at Purdue and elsewhere at rates exceeding 70,000 plants per acre.

(2) Short-stalked hybrids. All parts of the plant are normal in size except the stalk, which has short joints, especially below the ears. Corn breeders call these plants "brachytic." In 1958, dozens of farmers in states near Illinois plot-tested samples distributed by the University of Illinois. In states near Massachusetts, similar testing was conducted by the Eastern States Farmers Exchange. Many research men consider brachytic hybrids the most promising; the seed available on a small scale for 1959 planting is of this type.

Just as there are many breeds of normal hybrid corn, there are innumerable dwarfs of both types being tested. Through crossing, particularly with short-stalked types, dwarf counterparts of standard hybrids like U.S. 13 are being produced. The object of seed growers is to breed adapted dwarfs for all areas, in long, medium and short season ranges.

Stalk height and grain yield in dwarfs are relative factors just as they are with standard hybrids. Any farmer who has seen Iowa 939, for example, grow 15 feet tall and yield 150 bushels of corn an acre on rich bottom land, knows that the same hybrid might mature at a height of 7 feet and yield 45 bushels of grain on poor upland soil. Dwarf hybrids react similarly to environment. Those that generally tend to mature at four feet can grow twice that tall under favorable circumstances, within the potentials of their pedigrees. Ear height is likewise variable but it is influenced more by breeding than by growing conditions.

Standard hybrids are the survivors of over 25 years of development and selection. Dwarf inbreds at present represent only four or five generations of breeding. To hasten the process, frequently a winter generation is raised in Florida. Some of the seed to be planted in the Corn Belt this summer is being harvested in Florida early this spring. The problem of plant breeders is to cross and back cross and select in order to perfect a hybrid that is commercially acceptable.

Ears from dwarf corn, on the left, are not dwarfed. In total yield, the dwarf was 12 per cent behind the normal corn on the right.

Most of the selections must be discarded. On some, ear height is too variable with a few ears laying on the ground while other plants of the same strain have ears three feet above the ground. Other strains prove unsatisfactory in other respects, in height, in leafing, in yield. Some crosses turn out to be two feet tall, some sucker like large clumps of Johnson grass, some are completely barren of ears. When a promising cross is found, it must prove itself in many locations under greatly varying conditions before it can be considered ready for use.

Corn breeders like Earl R. Leng of the University of Illinois at Urbana believe they are near to producing a dwarf corn that will stand well, pick well and yield well. "We are shooting for a short-stalked hybrid that grows four or five feet tall with the ears twelve to twenty inches above the ground," Dr. Leng pointed out. "In the big corn-producing counties of Illinois, Iowa, and Nebraska, lodging is a serious problem in three out of every five years. Lodged corn usually breaks in the first few joints above the ground. The number of joints or internodes in dwarf corn is the same as in normal corn. But in dwarfs, the joints are from one to three inches long, instead of a normal six inches. The ears grow less than two feet off the ground rather than at the usual forty-two to fifty-six inches. This joint length and ear height reduce leverage action in the wind. The more closely-spaced nodes add strength. There is no doubt about the superior standing ability of dwarfs. In test after test, where the normal hybrid U.S. 13 has shown as many as half its stalks lodged, its dwarf counterpart, Illidwarf 513, has stood erect. In only a few tests has any significant lodging of the dwarf been seen. Even under very severe conditions, several of the dwarfs under test have remained almost a hundred per cent erect."

The big disadvantage of dwarfs is their reduced yield. Dr. Leng stated, "Yields of some dwarf hybrids have in certain cases compared favorably with normal, adapted hybrids. In general, however, yields have been ten to twenty per cent less for the dwarfs. With further breeding work, in my opinion, yields can be raised to a satisfactory level. Late harvesting might favor the dwarfs. With normal hybrids a twenty per cent loss from down corn at late harvest is not unusual. It is the bushels harvested, not the bushels grown, that count."

The best consistent yields have been reported by D. L. Matthews for Eastern States Dwarf 602, brachytic counterpart of Pennsylvania 602. In over 30 demonstration plantings in Pennsylvania, Massachusetts, Rhode Island, Connecticut, Delaware, and Maryland, the tall hybrid averaged 109 bushels per acre, with the dwarf averaging 107 bushels. The high yield of the dwarf was due to its prolific tendency for it averaged 1.7 ears per plant compared to 1.0 ears per tall plant.

Southern experience has not been so favorable. Of 32 dwarfs tested at Raleigh, North Carolina, all fell in the yield range of 65 to 85 per cent of the normal hybrid, Dixie 82. D. L. Thompson, USDA Research Agronomist who conducted the tests, said, "Additional breeding is necessary to narrow the yield gap. Standability is in favor of the dwarf. Last year, after hurricane Helene passed through, a dwarf

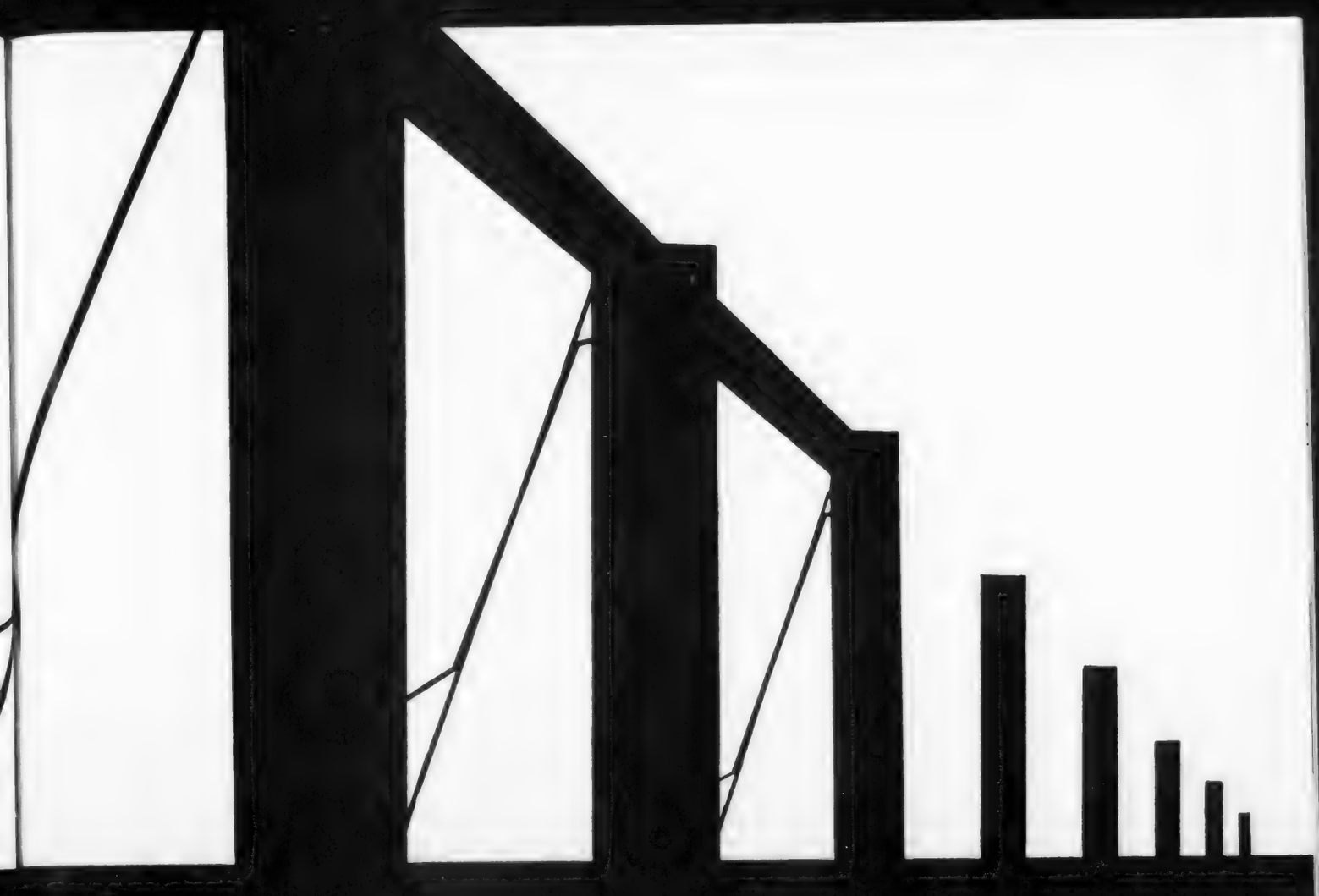
(*Continued on page* 96)

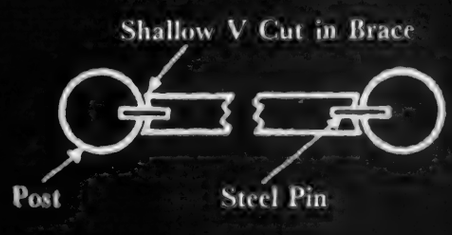
Answers to your fencing problems

Some day an invisible ray projected along the boundary of a field may protect the corn from the cows and afford an impenetrable shield between the boar and the gilts. But until the dawn of that distant day farmers and ranchers are going to have to depend upon the old standby of posts and wire to keep their stock where it belongs.

Even in this day of automation, fence building is still a tedious post-by-post operation. Yet there are ways to speed it up and steps which, if followed faithfully, will produce a fence which will still be serviceable long after it has been written off the depreciation schedule and which will be practically maintenance free.

Thousands of miles of new fence will be built this spring and summer by farmers who have hundreds of other demands on their time and who can ill afford to invest their cash in a poor





The Rosemont corner diagramed above can be built in less than an hour by two men using pointed wood posts and a power post driver. Properly erected it will stand for 25 to 30 years. John Neetzel, University of Minnesota, demonstrates the action of the post driver (left). The braces are not notched into the posts in the Rosemont corner. Instead, a dowel pin is used as shown in the drawing (far left).

piece of construction. FARM QUARTERLY queried two of the nation's outstanding authorities on farm fence for the latest in construction ideas and a review of some of the basic principles.

G. D. Kite is professor of agricultural engineering, Virginia Polytechnic Institute, Blacksburg, Virginia.

John R. Neetzel is research associate, School of Forestry, University of Minnesota, and forester, Lake States Forest Experiment Station, St. Paul, Minnesota.

G. D. Kite, ag engineer, Virginia Polytechnic Institute, shows how an end assembly of the type described in the article is used at a gate. Notice the horizontal braces level with the top wire of the woven wire fence; the diagonal brace wires running from the bottom of the end post to the top of the first brace post, from the bottom of the first brace post to the top of the second one.

They have done much work in fencing research, have staged innumerable fence-building demonstrations. Their combined experience covers a variety of regions and terrain from the small, hilly fields of the Appalachians to the vast, endless expanse of the plains.

Question: In getting into this business of how to build a better fence, is there any one factor to which we can point as of the utmost importance?

Neetzel: Yes. The foundation is the most important thing in the construction of a house or any other building and so it is with a fence. "How Firm a Foundation" should be the fence builder's theme. The ends and corners are the foundation of the fence. If these are built right that fence is going to stand and have a long, serviceable life despite the attacks of roguish cattle, rooting hogs, snowdrifts and trespassing hunters.

Kite: I'll concur in that 100 per cent. And I'd like to remind the farmer not to forget the essential ingredients which go into making a good fence. Those are long-lasting materials and proper erection.

Question: Could you point out specifically what you mean by long-lasting materials, Mr. Kite?

Kite: We expect the kind of fences we recommend building in Virginia to last 25 years or more. To get that kind of life you have to use treated wood posts or steel posts and wire of the better grade. The most practical woven wire fence has number 9 wire for the top and bottom strand with number 11 filler. The heavier wire not only is stronger but has a better coating of rust-preventive zinc. The lighter grades cost less but are more expensive in the long run.

Another point a man should watch in buying wire is that it is of springy steel. This steel tends to contract more after it has been stretched and thus makes for a tight frame. A fence made of soft wire lacks the spring action and will sag.

Question: When you speak of treated posts to what kind of treatment do you refer?

Kite: I have no preference. The four materials commonly used in Virginia are creosote, pentachlorophenol (Penta), copper-arsenate and osmosar. With creosote and penta, pressure treatment is recommended.

Neetzel: I would recommend buying the commercially-treated posts, particularly if you can be sure they come from a reputable manufacturer. These posts will last 25 to 30 years. Often when we try to do the treating job on the farm we either use the wrong species of wood or fail to give adequate treatment or both. Home-cut pine or red oak posts will take treatment well. The treatment must be applied according to the preservative used.

Question: You mentioned, Mr. Kite, that not only is long-lasting material one of the essentials of a good fence but that proper erection is the other member of the team. What do you cover under the term proper erection?

Kite: As you can imagine, that covers a lot of territory. To summarize it, though, I would include under this head the type of end, corner and in-line brace assemblies used, the location of these elements, attaching the wire, stretching, and the use of the right kind of staples. We can cover each of these items in detail as we go along. To really economize on time and money in fence building a man should do a careful job of planning before he ever begins to set a post.

Question: How much does that involve?

Kite: Really not too much. The location of the brace assemblies is one of the most important steps in construction. To determine where these assemblies are going to be—and there should be one wherever there is a distinct change of grade or direction—the line of the fence should be carefully studied. From this it can be determined how many line posts will be needed and how many brace posts. The posts in the brace assembly should be 8 feet long as they must be set at least 3½ feet in the ground and they should be 5 to 6 inches in diameter (the anchor post 6 inches, the brace posts 5 inches). The line posts, anywhere from 2½ to 4 inches in diameter, go in the ground only 2 to 2½ feet and need be only 7 feet long.

In Virginia we usually space our line posts 12 feet apart in the straight spans. In other sections of the country they space them as much as a rod apart.

The posts in the brace assembly are 8 feet apart.

By making a careful study of the fence line a man can make an accurate estimate of how many of each kind and size he is going to need.

Question: Since both of you gentlemen are agreed that the end, corner and brace assemblies are the foundation of the fence and the secret of its strength and longevity, what type of construction do you recommend for these parts?

Neetzel: Up in Minnesota we have adopted exclusively what we call the Rosemont corner. Henry Giese at Iowa State designed this assembly a number of years ago and it has since had general acceptance.

Kite: Yes, we use a similar plan although we have no particular name for it. It consists of a vertical anchor or corner post, vertical brace posts 8 feet apart with horizontal wood braces parallel to the ground and as close to the top as practical, usually even with or just below the top wire of a 47-inch woven wire fence, and diagonal wire braces. (This assembly is illustrated in the drawing on page 65 and the photograph at the top of this page.) Basically, it is a series of vertical posts tied together with horizontal posts and diagonal wires.

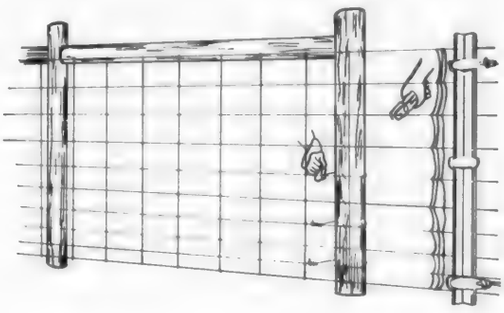
Question: Let's take the construction of this assembly step by step.

Neetzel: All right, I'll give it to you step by step; but first let me point out another factor which has led to the acceptance of the Rosemont corner. It's the economics of the thing. You can take two big posts, put them far enough into the ground and put enough anchors and deadmen on them to stand almost any amount of pull. But at present labor and material costs, this type of construction is very expensive.

The zig-zag looks like the fence builder's nightmare but it makes a first class temporary fence for sheep, swine and other small stock. The woven wire is stretched loosely between corner posts, and is tightened by driving the steel line posts at an angle, the alternate posts slanting in opposite directions.

The Rosemont corner uses relatively small posts which can be power driven—this is a point we haven't touched on yet, and a mighty important one—and this greatly reduces cost. With a power driver, one experienced man with another man lacking in experience but a willing worker, can build a corner in less than an hour.

Now to get back to the actual building.

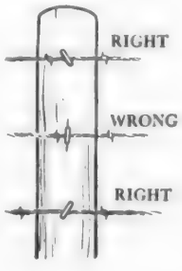


The wire should always be wrapped around the end post. Push the last few stays toward the stretcher; cut the center wire, wrap it around the post and splice it on itself; repeat with alternate wires above and below until the job is completed. The sketches below show the right and wrong ways to drive staples.

First, you select the site for the corner. Drive your corner post in at least 3½ feet deep; then lay your horizontal brace on the ground to measure the position of the first brace post. Drive that post in and measure the position of the second one in the same manner. For a 20-rod span we use two brace posts or "approaches." If the span is more than 20 rods we use three or four braces.

To save time and also to make the assembly strong we do not notch the posts to hold the horizontal braces. Instead, we put a very shallow notch in the end of each brace and drill a ¼-inch or ½-inch hole in the end of the brace and a similar hole in the post where the brace will meet it. We slip a steel pin about 4 inches long (they can be cut from old bolts or reinforcing bars) into the hole. This gives a very strong attachment as the assembly is pulled together by the diagonal wire braces.

The wire, a double strand of number 9, is wrapped around the bottom of the corner post and run to the top of the first brace post; from the bottom of the first brace post to the top of the second one, and so on, always running up in the direction of the fence. We have found that a good way to attach the brace wire is to splice it at about the length it will have to be when finally in place; then we attach it with a staple to either the bottom of the corner post or the top of the brace post and drive it into position on the other post. This gives the necessary tightness without twisting. We may give it a twist or two afterwards to make it look better, but actually it isn't necessary. If we take down the corner we can use this brace wire over again.



Question: You mentioned driving wood posts with a power driver. Does this actually save much time? And is it practical everywhere?

Neetzel: To answer your first question first, power post driving is the biggest time-saver since the introduction of wire fence. Under the old system of hand digging and tamping, a man could set 4 posts per hour. The power digger was a big improvement but it still left tamping as a hand job and about the best one man can do with a power auger is to set 6 posts an hour. The power driver eliminates the need for tamping, making it possible for a man to set 12 to 15 posts an hour; two men can easily set 25 to 30 an hour.

As to how practical power driving is, let me say this: We have driven mile after mile of fence in Minnesota — corners, ends, braces and line posts. Driving is easier, of course, in moist soils; but you can drive posts in ground which is much too dry to permit the operation of a power auger and you can also drive posts in ground which is too wet to dig. Sandy or peat soils are the most difficult to drive in. It is hard to get the post started; it keeps trying to jump out of the ground.

Rocks, of course, are an obstacle. Still you can use a driver anywhere you can use a power auger. When we find we are running into a rock a foot or so below the surface, we pull the post up and move along the fence line until we are able to drive it in without trouble. It's not going to hurt if it is a few inches ahead or behind the spot where we had intended it to go. When we hit rocks two feet below the surface we just quit driving and cut the post off. A driven post two feet deep is as substantial as one in a dug hole two and a half feet deep. Of course, on corner posts we must go down at least 3½ feet.

Question: Do these driven posts have to be sharpened?

Neetzel: Yes. A sharpened post compacts the soil around it as it is driven and automatically tamps itself. But sharpening is no particular problem. Some of the commercial manufacturers have big Paul Bunyan pencil sharpeners to do the job. But any farmer can do the same thing with an ax, or better still with a circular saw. I advise farmers to keep their old buzz saws handy just for this purpose. The post should have a blunt point ¾-inch wide.

Question: Can any kind of wood post be driven?

Neetzel: Yes. The kind of wood isn't as important as the degree of straightness. We have a Jack pine post we have driven over 100 times in demonstrations and it is still in usable condition.

Question: Have you had much experience with post drivers in your part of the country, Mr. Kite?

Kite: We feel that drivers are not practical on small farms and on hilly land. They are hard to line up on a hill.

Neetzel: That's right. Because of their expense—they cost around $200 to $400—drivers are generally found today on only the larger farms and the ranches of the west. But I think with a little experience a man can soon learn to line them up without too much trouble on all but the steepest hills.

Post drivers have been in use now for 25 years or more and they are here to stay. As a matter of fact, I'd say they are the fence tool of the future.

As for the economy of using them on small farms, a post driver is the ideal tool for a group of farmers to own and use cooperatively. They may all have to combine wheat or bale hay or pick corn at the same time; but they don't all have to make fence on the same day.

Question: To get back to the fence itself, how often do you have to put in a brace assembly?

Kite: Wherever the grade or direction of the fence changes. I also put in a brace assembly at least every 20 rods on the contour. If in going over a hill the fence rides down more than 12 inches, a new brace is needed. The same is true in a valley. If the fence has a tendency to ride up too high it's time to put in a new brace and begin a new span.

Neetzel: I would suggest that on a steep hill you end your fence at both the top and bottom of the hill. Then build a fence of lower quality on the hillside. You may have to put the posts closer together but you can use old wire or maybe use barb wire. Stock don't put much pressure on a hillside fence.

Question: Glad you mentioned stretching. That's the next point we should talk about. How do you do it?

Kite: You lay your roll of woven wire on the ground a few feet past the end of the corner assembly and with the close mesh toward the post. Unroll it past the first couple of line posts; remove the first stay wire from top to bottom; stand the fence upright against the corner post and adjust the fence to the desired height. Staple the fence into position, then extend each line wire around the post and splice it onto itself. You can do this job much easier with a splicing tool than with pliers.

(*Continued on page* 100)

How Far Can I Push My Credit?

By Earl F. Crouse

JOHN DABNEY AND HIS PENCIL—A SUMMARY OF HIS ANALYSIS

	PRESENT PROGRAM	POSSIBLE ALTERNATIVE PROGRAMS		
	40 milk cows 210 a. owned 80 a. rented	65 milk cows 210 a. owned 80 a. rented	100 feeder calves 210 a. owned 80 a. rented	20 beef cows 100 sow program 290 a. owned 80 a. rented
TOTAL VALUE OF REAL ESTATE—CHATTELS—CASH				
Farm—real estate	95,000	100,000*	95,000	150,000
Livestock	14,400	22,700	14,000	11,700
Machinery (depreciated)	20,000	20,000	20,000	20,000
Money in bank	2,000	2,000	5,400	870
VALUE	131,400	144,700	134,400	182,570
ANTICIPATED INCOME BASED ON OUTLOOK				
Sale of dairy products	12,600	20,480	——	——
Sale of livestock	2,300	3,500	25,480	45,480
Sale of crops	6,500	2,600	5,500	3,500
TOTAL INCOME	21,480	26,580	30,980	48,980
ANTICIPATED EXPENSE BASED ON OUTLOOK				
Real estate mortgage payments	2,560	2,560	2,560	4,920
Intermediate credit payments	3,930	9,130	——	9,130
Interest on operating loans	——	——	840	——
Feeder cattle loan	——	——	14,000	——
Insurance—life and farm	650	900	750	1,350
Taxes—real and personal	1,100	1,200	1,100	1,700
Feed-seed-fertilizer	2,900	3,770	2,800	16,700
Fuel and oil	900	1,000	900	1,200
Hired labor	500	3,000	250	3,000
Veterinary and breeding	600	1,000	200	1,000
Repairs—machinery and building	1,000	1,250	1,000	1,800
Living expense	5,000	5,500	5,000	5,500
TOTAL EXPENSE	19,240	29,310	29,400	46,300
OPERATING MARGIN				
Anticipated income	21,480	26,580	30,980	48,980
Anticipated expense	19,240	29,310	29,400	46,300
UNCOMMITTED INCOME	2,240	—2,730	1,580	2,660
DEBT POSITION AT START				
Farm mortgage	33,630	33,630	33,630	71,500
Machinery chattel	10,000	10,000	——	10,000
Livestock and improvement loans	——	20,000	14,000	20,000
TOTAL	43,630	63,630	47,630	101,500
Total annual payments on interest and principal	8,490	11,700	3,400	14,050
DEBT POSITION AFTER FIVE YEARS				
Farm mortgage	27,050	27,050	27,050	65,990
Machinery chattel	——	——	——	——
Livestock loans	——	——	14,000	——
TOTAL	27,050	27,050	41,050	65,990
Total annual payments on interest and principal	2,560	2,560	3,400	4,820
NET WORTH POSITION (WITHOUT INFLATION) allowing $3,000 yearly depreciation on farm machinery				
At start	87,770	81,070	86,770	81,070
End of year 1	90,550	83,890	89,570	87,290
End of year 5	106,210	95,660	101,250	112,750

* An estimated $5,700 invested in buildings cannot be recovered in increased sale price.

WHEN John Dabney walked into his bank that morning last fall he was in the same boat you and I frequently find ourselves riding. He was in a financial bind. It wasn't that he was really hard pressed. He had a healthy bank balance and no one was threatening to attach his tractor or repossess his car. Yet he could see clouds.

Modern farming is ravenous in its demand for capital. While Dabney was getting along all right he realized if he was to stay in business it was going to require further investment—more than he had funds to meet.

The question was how far could he afford to push his credit without courting trouble?

At 38, John Dabney is a hard working, successful dairy farmer. His father and grandfather were farmers before him. He and his wife, Millie, have no intention of being the last in the line. John did not get to college because of the war; but he did study farm management in a GI night class for two years. His neighbors, his banker, the county agent, all rate him as a top farmer.

The Dabney farm of 210 acres near Champaign, Illinois, would bring at least $95,000 if it were put up for sale. John got it on contract for $60,000 in 1950. He paid $10,000 down. In 1954 he sold some cattle and got it refinanced with a 25-year insurance company loan of $40,000 at 4 per cent interest. He has worked this loan down to $33,630. His annual payments, including interest, are $2,560. Real estate taxes run about $700 a year.

The operation presents some special management problems since it is a livestock unit in the center of a cash grain area. About 50 acres are permanent pasture, and another 50 acres are rolling land best suited to rotational hay and pasture. That explains the dairy and also some of the alternatives among which Dabney may choose.

His farm machinery consists of 3 tractors, a baler, combine, corn picker, plows, drills, everything in the line of field equipment needed to handle his own land plus a rented 80. He could farm with something less than this, but he has to make the minutes count if he is to keep up. He owes $10,000 on the machinery, the debt covering the unpaid balance on a new tractor outfit bought last fall and a self-propelled combine bought two years ago. The bank holds this chattle mortgage which is amortized over 3 years at 6 per cent interest.

John milks 40 cows morning and night. He saves back 7 or 8 heifer calves as replacements each year. His wife, Millie, has 500 laying hens. That is their total livestock.

They get by without hired help except for a couple of high-school-aged nephews during the summer, and a little day labor now and then. The work load has built up gradually until it has become a man-killing schedule without a break—ever. Always there is the milking to do—morning and night, 730 times a year plus 2 more in leap year.

"It's getting too much for me," John told Millie last fall, "but we can't afford a man on a unit this size. Either I have to cut down some place or expand enough to make this a two-man business. We seem to have a place for every dollar. Next year will be even harder, with Clarice starting to college, and the other two girls in high school. And Jack won't make a hand for at least 5 more years. With sports after school, I can't count on him for much help.

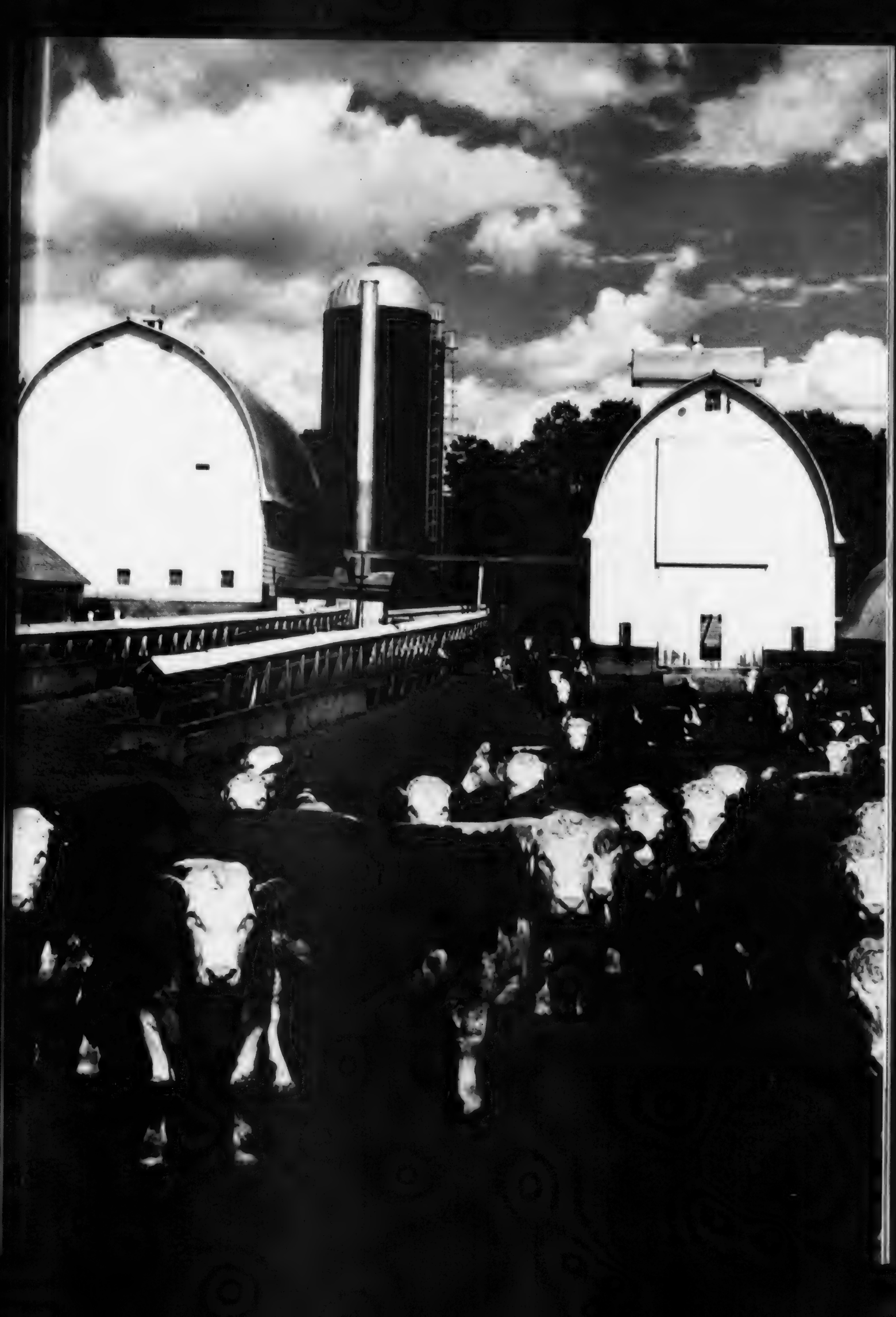
"I think I'll have a talk with Lew Clausen."

Next morning he walked into the bank where Lewis Clausen, after years of experience as secretary of a Production Credit Association, heads the farm department.

Dabney began by telling about the little talk with Millie. Clausen approached the problem by suggesting: "Let's

(*Continued on page* 142)

A good feeder can fill his lots without investing a penny in actual cash. But buying the cattle is only the beginning. Financing the whole operation requires a strong line of credit. How far a man can extend himself can only be determined by a careful analysis of his financial statement (as at left) and the prospects for the projected enterprise.

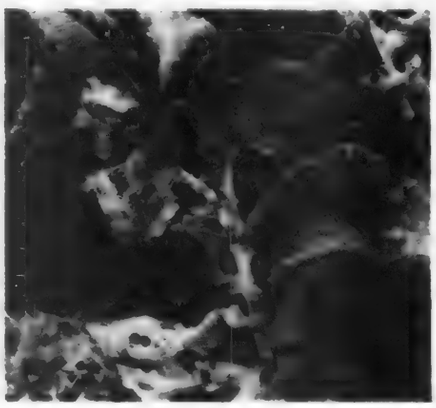


Hail damage is always spotty throughout an area. The storm cell, which is dumping its damaging load of ice pellets in the picture, will soon be dissipated; then another cell may go into action and strike a location miles away.

HAIL IS HELL

The bare corn field and denuded trees look like autumn. Actually, the picture was taken in mid-July, near Salix, Iowa, after a violent hailstorm had struck the area.

And it was hail, not the combine, which left this stubble in a wheat field in Montana. Some of the best wheat country is most susceptible to hailstorms.



A full-grown tobacco plant makes a perfect target for hail. In adjusting insured losses in Kentucky and Tennessee, 50 punctures are considered the equivalent of one leaf lost.

This Illinois field of soybeans was on its way to making a 50-bushel yield. Then the storm hit. The crop could have been insured in that part of the State at a rate of $2.40 per $100 of insurance.

PETER JEFFERY is a dangerous man to drive with in the summertime. Even his wife says so. "He can never take his eyes off the crops long enough to watch the road," she says. "My land, sometimes I think it would be a good idea if the state would paint a strip of corn right down that center stripe. Then maybe these crop jockeys would drive with eyes front once in awhile."

But the sight which filled Jeffery's eyes as he drove toward Salix, Iowa, that Fourth of July morning in 1956 was enough to turn any farmer's head. His own field stretched off to the north, a whole quarter section of the best-looking corn he'd ever seen.

A week later excellent weather had added glory and growth to the crop. It had started to tassel. The winds blowing from across the cream-tinged coffee of the Missouri rustled the long, green leaves of the plants against each other in a soft summer symphony.

Then suddenly on the afternoon of the eleventh Nature showed her malevolence. A line squall moved in from the northwest with the speed and determination of a semi-trailer heading for the elevator with a load of new wheat. Its huge thunderclouds thrust their heads 8 to 10 miles above the overcast fields. Some said they seemed to have a greenish tinge. They crashed with thunder and hurled bolts of brilliant lightning earthward. Rain poured from their undersides as they scudded along and here and there they dropped a barrage of hail.

Driven by furious blasts of wind, hail fell for less than 10 minutes. But when the storm had passed, Peter Jeffery's quarter section was no longer a corn field. It could barely be called a stubble field and the trees along the fence row were as bare of leaves as if it were the middle of January.

HAIL IS HELL

Hail causes over 60 million dollars damage to crops in the United States every year. What causes hailstorms and how the icy stones are formed is still something of a mystery. By the use of radar and other modern meteorological techniques, however, these storms can now be tracked and general predictions made as to their occurrence, though it is still impossible to pinpoint the locale of their destruction.

But even the most accurate forecasting is of no value to the farmer whose growing crops are at the mercy of the storm. His only recourse is insurance; and the only way for a man to get the most for his money in buying insurance is to know what the policy covers and how losses are adjusted. Here is a detailed analysis of these points.

These hailstones the size of hen eggs fell in Columbia, South Carolina, in the spring of 1950. Big stones are spectacular, but it is the marble- to walnut-size ones driven by violent gusts of wind which cause the most damage.

By Charles R. Koch

Jeffery's was just one of thousands of disastrous brushes farmers have with hail every crop season. With potential yields growing ever larger and the capital tied up in a crop ever on the increase, hail is becoming a more important source of loss to the American farmer. Of all weather hazards only drouth and frost cause more damage.

The 116 insurance companies which are members and subscribers of the Crop-Hail Insurance Actuarial Association last year paid out a total of over $41 million in losses on crops alone. As these companies write about 75 per cent of all crop-hail insurance in the United States this would indicate a total of about $55 to $60 million in recovered losses last year plus a never-to-be-known amount in uninsured losses.

In 1951 the Crop-Hail Association losses broke the $20 million mark for the first time and have never since dropped below that level. Record loss year was 1956 when hail caused $44.9 million damage to crops insured by Association companies. It should be emphasized this is solely crop damage. Damage to buildings and other property would add a sizeable amount to this.

And hail can do plenty of damage to buildings and equipment. It tears the siding off homes, beats shingle roofs to shreds, smashes in windows, pounds cars and trucks till they look like they had been beaten with a thousand hammers, and riddles the windshields of fast-flying planes. But here the emphasis will be on crop damage.

What Makes It

The men who know hail best are inclined to admit, "We don't know a heck of a lot about it." For years it has been looked upon as an interesting phenomenon; records—not too complete—have been kept of hailstorms at some 200 principal weather stations throughout the United States. Trouble is, hail has a way of ignoring weather stations and beating the very daylights out of areas far removed from such spots.

Here are some of the facts these stations have gathered:

The largest hailstones of record fell at Potter, Nebraska, July 6, 1928; they measured 4½ to 5¼ inches in diameter—grapefruit size—and the champion of the lot taped 17 inches in circumference and weighed a pound and a half. These stones did little damage to crops; only one stone fell to about 100 square feet of ground. It is the marble- and walnut-sized stones coming in great bunches and driven by powerful gusts of wind that tear the guts out of crops.

Only one human death has ever been attributed to hail in this country. That tragedy occurred near Lubbock, Texas, in May, 1930, when a young farmer was caught by a sudden hailstorm in an open field and was pelted so badly he died within a few hours. But in India in 1888, 246 persons perished from injuries received in a violent hailstorm; and in 1956 over 30 people died in a severe storm in Pakistan.

Hailstones piled up to depths of two feet and more in Omaha in May, 1936, and a Sioux Falls, South Dakota, storm piled stones so deep in June, 1956, that the snowplows had to be called out.

That's the way it is with hailstorms. Folks have always been eager to report the spectacular, but little was done in investigating the garden variety of the species.

But things have been different recently. The Air Force and the commercial airlines have resented the way their planes have been chewed up on the ground and in the air by hail; crop insurers have resolved they are going to have a better idea of what this stuff is and what causes it; and the Weather Bureau has decided to re-examine the whole situation. The result has been that organizations like the Crop-Hail Insurance Actuarial Association, United Air Lines, The Air Force Severe Weather Warning Service, the Weather Bureau Severe Local Storm Center (the last two at Kansas City) and the Illinois State Water Survey at Champaign have been giving a lot of concentrated attention to the problem. The facts of life of the hailstorm are being disclosed by scientific research.

The hailstorm is definitely a spring and summer phenomenon, except in northern California and Washington where hail occurs in the wintertime and is often classified as snow pellets. Generally, the higher the altitude east of the continental divide the more frequent and severe are the hailstorms. Hail always occurs in company with thunderstorms, though there are many thunderstorms without hail; and it never falls except when the ground temperature is well above freezing. Large bodies of water, the oceans and the Great Lakes, seem to have a deterrent effect on hail.

Richard J. Roth, slim, young manager of the Crop-Hail Insurance Actuarial Association, and a professional meteorologist, points out hail seems to follow the sun north each spring. "In April," he says, "the maximum hail frequency is in northern Texas and western Oklahoma; in June, western Kansas, western Nebraska, eastern Colorado and eastern Wyoming; and by July it has moved up into southwestern South Da-

(*Continued on page* 176)

If our wells run dry, we surely perish.
Fortunately we are learning to store water.

Refilling Our Wells

By Joe Muir

Arnold Frew, standing on the valve catwalk of the Nacimiento Dam, grins with good reason. The gushing water released from the dam built by Frew and his fellow farmers is raising the water table in the whole Salinas Valley and cutting pumping costs at every well.

WE KNOW SOME of the answers, but the problem itself is staggering. A great underground drouth is upon us. Since more than half of our 28,000,000 acres of irrigated land is watered from wells, this is a problem of real magnitude. In the broad valleys of central and southern California, on the high plains of Texas, in the rice country of Arkansas and Louisiana, on the pineapple and sugarcane plantations of Hawaii, in the Salt River and Santa Cruz Valleys of Arizona, farmers are pumping their wells dry. Unless their wells can be refilled, these farmers face disaster. To some, disaster has already come.

A Bakersfield, California, farmer said, "Like everyone else, I punched down wells to irrigate cotton and potatoes. Water tables were lowered to the point where my pumps were sucking air and mud. All I could do was shut down. I figured I lost a $10,000 investment on every well I had drilled." In another Kern County district, several farmers were astonished when the water level dropped so sharply the land began to settle, buckling and severing underground irrigation pipes. During this period, farmers in competition to get while the getting was good, rushed irrigation several weeks ahead of normal.

An even greater disaster struck farmers in Louisiana, Texas, and in the Salinas district of California. Here the great overdraft on the underground water resources pulled sea water into the underground reservoir—the aquifer—causing immediate damage, perhaps permanently contaminating it. Salinas lettuce growers who had paid as high as $3,000 an acre for their farms had the bitter experience of watching the brackish irrigation water kill their crop and salt their land.

We learned some of the answers of refilling our wells by studying how nature refills these underground reservoirs and by studying the aquifer itself. The aquifer is an underground sand or gravel bed or a great slab of porous, spongy sandstone or limestone through which water can flow. "Picture a mammoth irregular-shaped goldfish bowl filled with sand and gravel," A. A. Tavernetti, a California Farm Advisor, explained, "then imagine enough water poured in to fill the tiny spaces between the grains of sand and gravel. The bowl looks full with just the sand and gravel, but it's surprising the amount of water it will still hold. A cubic foot of fine sand, for example, will hold three and three-quarters cubic inches of water and coarser aquifers will hold much, much more. Stick a tube down into the bowl and you'll find you can suck out a lot of water, but not all of it."

Natural waterbearing sands and gravels are often sandwiched between impervious layers of clay or shale. That part of an acquifer *not* covered by a waterproof material is the natural recharge area, for here rains and melting snow can percolate through the surface soil to form the underground stream that oozes through the porous aquifer. When the water flows from the recharge area to a lower elevation under an impervious cap, considerable pressure is built up and wells drilled through to the aquifer become flowing artesian wells. In the early days of Iowa such flowing wells had enough pressure to drive mill wheels.

The natural outlets for the aquifers are the springs and rivulets; others extend out as a part of the continental shelf and empty into the ocean.

California, which has become the nation's number one agricultural state through the use of irrigation, has many examples of underground water conditions and problems. Aquifers having a natural recharge area in the Sierra Nevada Mountains flow underground and are the source of water in the great central valley. Other aquifers are fed from the rivers. Many farmers thought they had found the promised land when the wells they dug into the mountain-fed aquifer turned out to be flowing wells. Beginning in 1860, more and more artesian wells were dug producing water for irrigation. Then, around 1920, they stopped flowing. One old-timer, ignoring the fact that there were 11,000 flowing wells in California by 1900, blames the oyster fishermen for the final exhaustion. "The oystermen used to bring in their catch and wash them at the flowing wells. I know. Used to watch them as a kid. Then when the oyster beds played out the oystermen packed up and went. And they left the water running."

The San Antonio, a tributary of the Salinas, is an upside-down river which sinks into its bed and flows underground. Extra water can be supplied the wells of the valley by impounding it and running it down this stream.

California's artesian wells in 1900 had an average depth of 40 to 50 feet. As the flow of water ceased, the wells were deepened and pumps attached. Now, the State has an estimated 100,000 pumped wells, some reaching down 2,500 feet. In the western part of Fresno County wells run 700 to 1500 feet deep, require a 250 to 300 horsepower electric motor to run their pumps, and cost about $70,000. The minimum economic land unit in this area is 2,000 acres.

In many of the valleys near the ocean, excessive pumping has forced the water table below sea level. Los Angeles County once had flowing wells, but by 1940 the

water table was 75 feet below sea level. As the aquifer has depleted, salt water flowed in from the Pacific. Farmers all along the California coast suffered the same experience. If misery does love company, these California farmers should feel less lonely knowing that rice growers in southern Louisiana, coastal farmers in Texas, and cane growers in Hawaii, too, have seen their fresh wells turn salt.

California and the coastal regions are not, of course, the only areas suffering from this man-made underground drouth. The water table has been falling steadily on the High Plains of Texas as farmers around Lubbock pump out an annual 5,000,000 acre feet of water from an aquifer with a natural recharge of 100,000 acre feet.

Rice farmers in Arkansas and truck gardeners in New Jersey have seen their water table drop and have had to compensate with deeper wells and more powerful, more costly pumping. Even the midwesterners over the great Dakota sandstone aquifer feel uneasy about their wonderful underground reservoir as the number of thousand-gallon-a-minute wells in the Dakotas, Nebraska, and Minnesota multiply.

Aquifers Can be Refilled

The first signs of insolvency at the water bank—lowering water tables and the ending of artesian flow—failed to alarm farmers for many years. Only a few farsighted leaders visualized the loss of billions in investment and income from thousands of farms if the aquifers were not refilled and maintained.

The concern of these few men, however, initiated the work which has shown us how we can aid nature in recharging the aquifer. The work has also shown some of the advantages of storing water in this way: the vastness of these underground reservoirs compared to any surface-holding device and no evaporation of the water stored.

Research workers discovered a number of practical ways of getting extra water into the aquifer. The most important of these are: (1) the construction of spreading beds or ponds over the natural recharge area which are designed to hold the water until it percolates into the aquifer; (2) by drilling their wells into the beds of streams so that as water is pumped out, other water is drawn from the stream into the aquifer below; (3) storing run-off water in times of heavy rain and then rationing it into the aquifer through such natural recharge areas as dry stream beds; (4) pumping water down into the aquifer in areas where they can collect excess water but find no natural recharge area.

One of the reasons farmers have taken so little interest in recharge work is the belief that only the government can tackle such a job. Though some of the recharge projects are government-size it is true, individual farmers and groups of farmers have taken on some spectacular recharge jobs. Take the case of the Salinas Valley where the overdraft on the aquifer was so great they were pumping in sea water.

"The name Nacimiento may have meant 'birth of waters' to the early Spanish Missions, but today it means full aquifers to farmers in Salinas Valley," said square-jawed William J. Redding, chairman of the Monterey County Board of Supervisors and a successful farmer in his own right at King City, California. "Farmers pushed through the big Nacimiento project that is filling the aquifer, feeding our wells, and pushing back the salt water."

His associate in the work, Arnold Frew, chairman of the Monterey County Flood Control and Water-Conservation District, continued, "And without the Salinas Valley aquifer, this nation's salad dish would be woefully short of lettuce. We produce over half the total supply right in this valley."

Frew, of King City, a straight, six-foot two, grey-eyed grower of vegetables and walnuts, in 1955 was chosen leader of the movement to refill the rapidly depleting aquifer in this intensively cultivated valley.

A Utah State graduate in horticulture, since 1919 he had built the 2,000-acre California Orchard Company into a top-producing walnut and vegetable farm and, as he put it, "I was determined to preserve its productivity." At the age of 64, Arnold Frew can still out-work and out-walk 'most anyone in the Valley. His unlimited energy and enthusiasm caught the Valley farmers and turned a vision into the reality of a safe and continued water supply.

"We had a stiff selling job to do," Frew said firmly, but smiled as he recalled the campaign to interest Valley farmers in the proposed Nacimiento Dam. "I'll never forget one Portigee farmer who came to one of our meetings and listened patiently to our story of the need of the dam to save the flood waters and then stood up and said in broken English, 'I'm not interested, I get my water out of the ground.'

"Early in its history the Salinas River was nicknamed the 'upside-down' river because only during flood stage did the waters ride on top of the stream bed and reach Monterey Bay," Frew explained. "Most of the tributaries come into the upper end of the Valley and sink into the broad sandy stream beds before reaching Soledad which is in the middle of the Valley. Farmers used to lay bets on the date the spring waters would flow under Soledad bridge.

"If water passed the bridge in early spring farmers down the river knew they would have more water to pump with less lift cost during the irrigation season," Frew continued. "Our rainy season starts in November and runs through March. The water would flow down the tributaries to the river and sink into the aquifers below. It would

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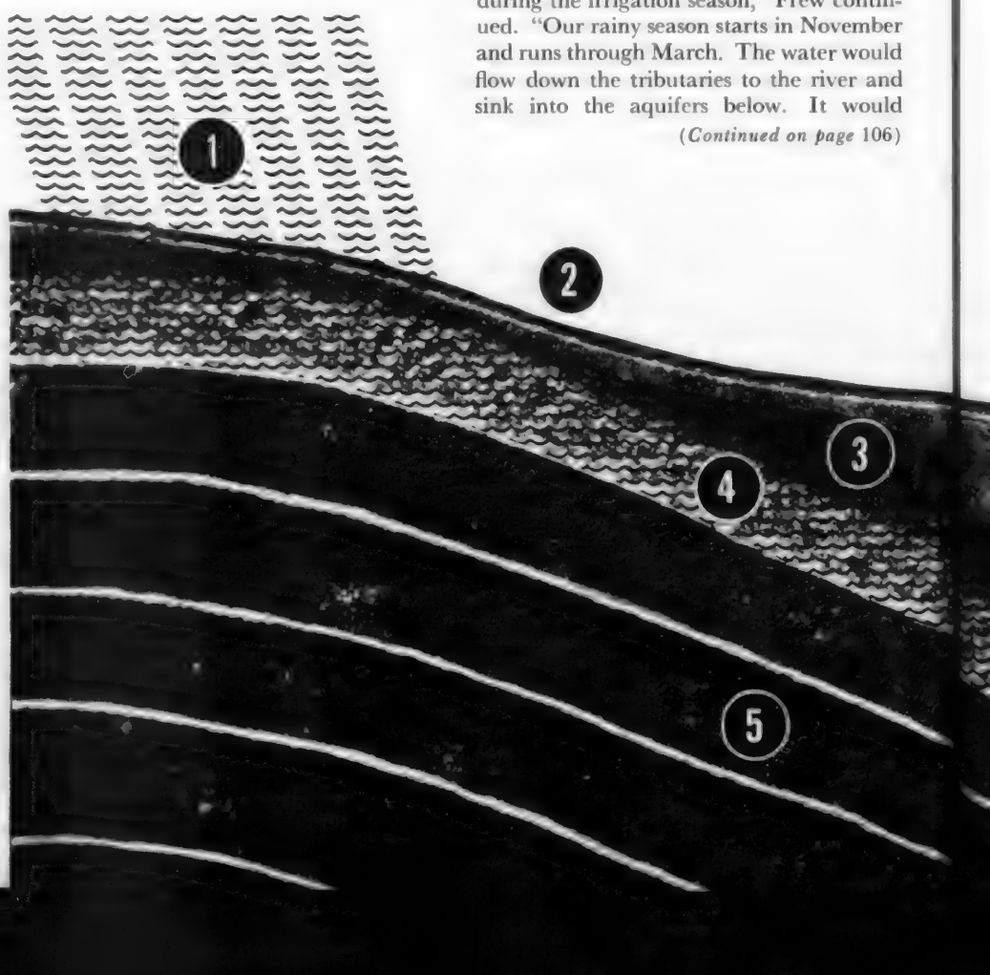
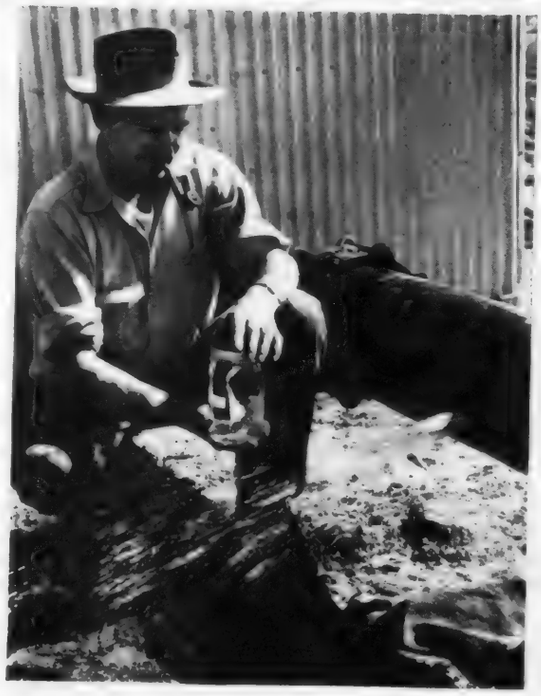


This is an aquifer. The natural recharge area (1) is where the rain is able to flow through the porous soil (2) into the water bearing sands and gravels (4) which are the aquifer. Further down the slope, the aquifer is capped by an impervious layer of clay (3). It rests on other impervious material (5). The aquifer naturally emptied into the sea at the edge of the continental shelf. When the first wells were drilled at (6) the pressure of the confined water made them flowing wells. Today, because of the over-pumping, a tongue of sea water has invaded the aquifer and contaminated the nearest wells. Recharging can be accomplished at the natural recharge area (1) or by drilling through the impervious cap with a recharge well.

Artichokes, irrigated from wells drilled within 100 yards of the ocean, prosper while fields across the road have been contaminated by salt water in the aquifer. Farmers such as Art Swank, foreman of the Hardin Farms, periodically test their well water for increased salinity.



By R. J. McGinnis

HE SCARED GRANDFATHER

HOW

William Holmes M'Guffey taught five generations of Americans that crime doesn't pay and virtue is always rewarded

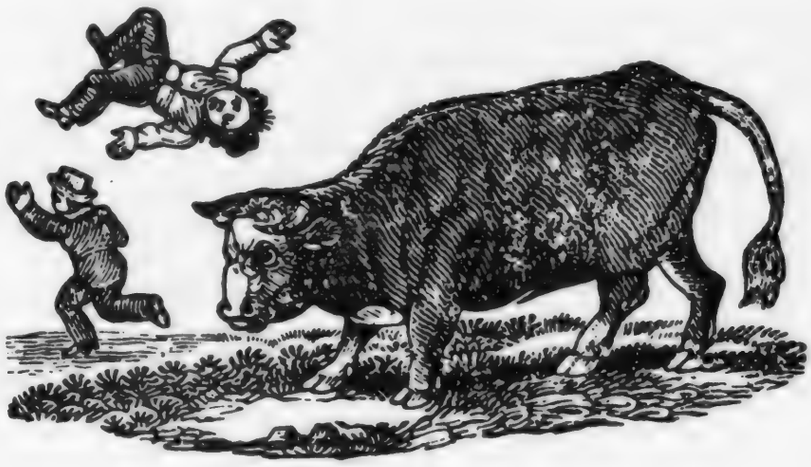
ed-u-cat-or	hu-man-i-tar-i-an	pi-on-eer
teach-er	phi-los-o-pher	ad-min-i-strat-or
preach-er	auth-or	the-o-lo-gian
mor-al-ist	ped-a-gogue	speak-er

At first thought it would appear pretty difficult to teach anything with a duck, much less draw a moral from her life and habits. Yet William Holmes McGuffey did it, and he did it so convincingly that every time grandfather heard a duck quack, he became a better man.

At least he learned the virtue of loving and obeying his mother. For in the First Reader, Professor McGuffey told him, "The ducks must love their mother, and do all that she would have them do. And I dare say they will do so, for God has made them know that they must."

In fact, grandfather had the devil scared out of him by Professor McGuffey. In every McGuffey story, Fate, or God, or society steps in to punish the wrongdoer, and there is no escape. In "The Truant", one of the boys playing hookey is almost drowned on his day of stolen freedom. In the Third Reader story, "True Courage", the boy who couldn't refuse a dare threw a snowball at the schoolhouse door and got a whipping for his foolish act. The lesson points the moral that the boy should have had the courage to say no to the dare.

(Continued on page 160)



The Wild Ox.

A M'GUFFEY LESSON

LESSON XVIII.

you	seen	eggs	peck	there	shell
use	duck	last	does	think	their
now	sits	life	stay	break	ver-y
way	wall	four	lead	makes	wa-ter
say	yard	born	know	young	moth-er

THE DUCK.

HAVE you seen the duck on her nest? She sits near the wall of the yard. She has eggs in her nest, and she sits on them to keep them warm.

And what is the use of this, do you think? Why, to make them come to life. She has been there, as you see her now, for the last ten days.

When she has kept her eggs warm in this way for four weeks, the shell of the egg will break, and the old duck will help to peck it off.

At last, out will come young live ducks; one out of each shell. Then she will have ten young ducks, for she has ten eggs in her nest.

God makes her know this; and has made her love her young so well, that she does not mind the long time she must stay on her nest, till they come out of the egg-shell.

Did you ev-er see young ducks, that had just come out from the shell?

As soon as they are born, their moth-er will lead them to the wa-ter; there they can swim, and they seem to like it ver-y much.

The ducks must love their moth-er, and do all that she would have them do. And I dare say they will do so, for God has made them know that they must.

ONE LITTER GILTS

Cy Doak farrows his gilts only once. Then they go to market, at 14 months, weighing between 400 and 450 pounds. From the best litters, the best gilts are picked to be bred eight months later. Doak is a hard hitter for his system, but there are some who can't follow it. One reason is disease.

NINETY-THREE PIGS from nine gilts. They are weaned at forty days. The gilts are finished and sold.

Some farmers wouldn't dream of selling nine gilts that can drop ten pigs each; healthy, uniform, meaty and vigorous pigs. But J. Herbert Doak does exactly that, because he is a "one-litter" gilt hog man, and in his own words, "The idea's got things really stirred up around here." Doak's neighbors, who call him Cyclone, have visited his 450-acre farm near Wilmington, Ohio, and imitate his system. Cy Doak has been in the hog business thirty years, and for the last ten has sold his gilts after one litter.

Doak is a tall, thin, wiry man, wearing khakis and a red cap which he constantly adjusts on his head. His enthusiasm for the technique is boundless. He lives at a rush, and his reasons for the system come almost too fast for digestion.

"We're after uniformity—fast," he said. "I want all my pigs to be alike. I've been trying for two years and now it looks as if we're all fired up and off to the races. But rapid selection for the qualities you want is only one of the advantages of the one-litter gilt." Doak has a new hardening shed, where he puts three gilts in together seven to ten days after they farrow in separate pens. "The gilts aren't big and old and clumsy," he said, "and we never have any trouble from crushing. A gilt's too nimble to lay on a pig." The contents of four such pens of three litters are weaned and put together in a larger pen under the same roof. They have creep feed from ten days and show no setback from their weaning at forty days.

At eight or ten weeks, they go to a pasture for a month, and then to the finishing pen. They go to the packer at about five months. "We farrow about once a month," said Doak, "skipping one occasionally—like November for the corn harvest. And we've been getting more uniformity every month. I want all of them to go to market just like that . . ." he snapped his fingers, "not 30 per cent at the top and thirty in the middle and the rest out later. I want ninety per cent number ones, and all off together."

Doak's cycle is simple. He will earmark all the gilts from the best two or three litters out of nine or so farrowing together. He picks the litters on their size and the qualities of the mother—milking, disposition and her treatment of the pigs, and her udder. And he looks for uniformity.

"Now from here on," he said, "I don't pick my own gilts. You can get so close to 'em you can't see the best ones. I think the average farmer often picks the worst gilts. He picks his gilts out of the poorest doers, because he's already sent the growthiest ones to market. They were ready first, and he needed the money. A farmer's often short of cash before he sells a load of hogs.

"I have Joe Stuckey (from the Wilmington College Research Farm) and Charlie Myers (an Armour buyer) pick mine. They choose the best gilts, and afterwards I see if they include any of the ones I earmarked. But they do the picking. They pick for uniformity, quick growth, and meat type. They like a long gilt, with a good ham, and firm flesh. Both of those fellows pick identical types of gilts," said Doak. "Now they're getting technical on me. They're picking hams and width and length of loin," he laughed. "But we're after a meat-type hog and a good fast-growing hog. They pick hogs that are muscled instead of fat. What has hurt meat-type hogs is that some farmers say they are poor doers. Now we're proving you can have both a meat-type hog and a fast grower."

Doak likes to have his hogs picked as late as he can, when they are nearly ready to sell. "A hundred and twenty pounds is a bit light," he said. "They can change too much between there and 200 pounds. I have been saving gilts that were overly fat. Now I want full hams, but not ones that shake with fat like this . . ." he waggled his hands.

The selected gilts stay in the finishing pens until the market hogs are sold, between 200 and 210 pounds. Then the gilts go onto pasture in small moveable huts. "We don't breed any gilt until she's eight months old," Doak explains, "because the first couple of times a gilt comes in heat, her ovaries aren't working properly. I want her to have two, or better, three heat periods before the boar comes in. We've had no trouble with litter size at all. None. Our herd average is 8½ pigs per gilt, fed out. "We've had nine gilts average twelve live pigs per litter." (Professor H. L. Self, of the University of Wisconsin, states, "It appears that the number of eggs produced at the first heat is smaller than the numbers produced at subsequent heat periods. The number of eggs at each period increases with each subesquent heat through at least the fourth or fifth and probably beyond this. There is one report that the eggs produced at the first heat are less viable than those of subsequent heats, and my own observations confirm this.")

In Defense of Gilts

Cy Doak has visitors constantly. His experience has given him more answers than the average visitor has questions. After only a slight prod, he preaches the one-litter

(*Continued on page* 157)

ONE LITTER GILTS

A gilt is bred at eight months, after three heat periods, and farrows her litter in four months. They are weaned at forty days, and the gilt is then finished for ten days. Then she goes for slaughter. From the best litters, gilts are picked to replace the mother, and a new boar is bought every year. The system gives fast selection for the qualities you seek, and the gilt is taxed as breeding stock, at the capital gains rate. Gilts are easier to handle, need fewer buildings and fences, and there is less investment in the breeding herd. Some diseases and parasites are "sold off" the farm. But a gilt is more susceptible to virus pneumonia than an old sow, and this disease, coupled with rhinitis, may give trouble in the first litter of a gilt. However, virus pneumonia can be beaten, and the one-litter system is excellent for a clean farm.

5 Automated Livestock Farms

By Fred Knoop

1 Jack Rundquist, Butler, Illinois, shoots feed across the barnyard to the cattle.

"You can call it 'automation,' 'power choring,' or 'mechanical feeding,'" says Jack Rundquist, as he shows you around the elevator on the 900-acre Turner Farm, "but I wouldn't be operating this place with only one other man if we didn't have this collection of motors, grinders, conveyors and blowers.

"We can store 10,000 bushels of grain in each of these four silos. We can either feed the corn wet or dry it and store it. Our 375-ton Behlen dryer will keep up with a picker-combine working the field. We've handled 1,500 bushels a day."

From the elevator (lower photograph), Rundquist uses a Mayrath auger to lift the corn to a Decker blending table. The concentrates and minerals come down in chutes from storage, the moving belt on the Decker table moves the feed to the hammermill, and a blower picks up the mixture and shoots it 284 feet across the barnlot (see arrow in lower picture) to a tank that holds 240 bushels of feed directly above the feed bunk auger. Once the blending table and blower are started, the mixing and blowing are automatic.

There are 300 Texas feeders, 42 Angus heifers and 60 polled Herefords on the concrete feed lot. Beside the lot is a 370-ton upright silo, equipped with a "Silo-Matic Unloader." As the unloader drops the grass silage into the trough (upper picture), the "Silo-Matic Scru Feeder" picks it up. The grain is fed down from the tank onto the auger, where it is mixed with silage. The 100-foot screw auger takes the silage out into the bunk, filling both sides in half an hour's time. Each head of cattle gets 4 pounds of corn, 2 pounds of supplement (16 per cent protein) and all the grass silage it can eat. The amount of feed and silage discharged along the bunk can be changed by adjusting the screw jack on top of the rails. "Feeding, mixing included, takes about half an hour," says Rundquist.

UP IN THE DEER COUNTRY near Warrior's Mark, Pennsylvania, William Hicks was one of the pioneers in the conversion to automation. His cows and chickens have been fed by mechanical hired hands since 1948. Like most pioneers, Hicks was a do-it-yourselfer, with the help of ag engineers from State College, Pa., about 20 miles away.

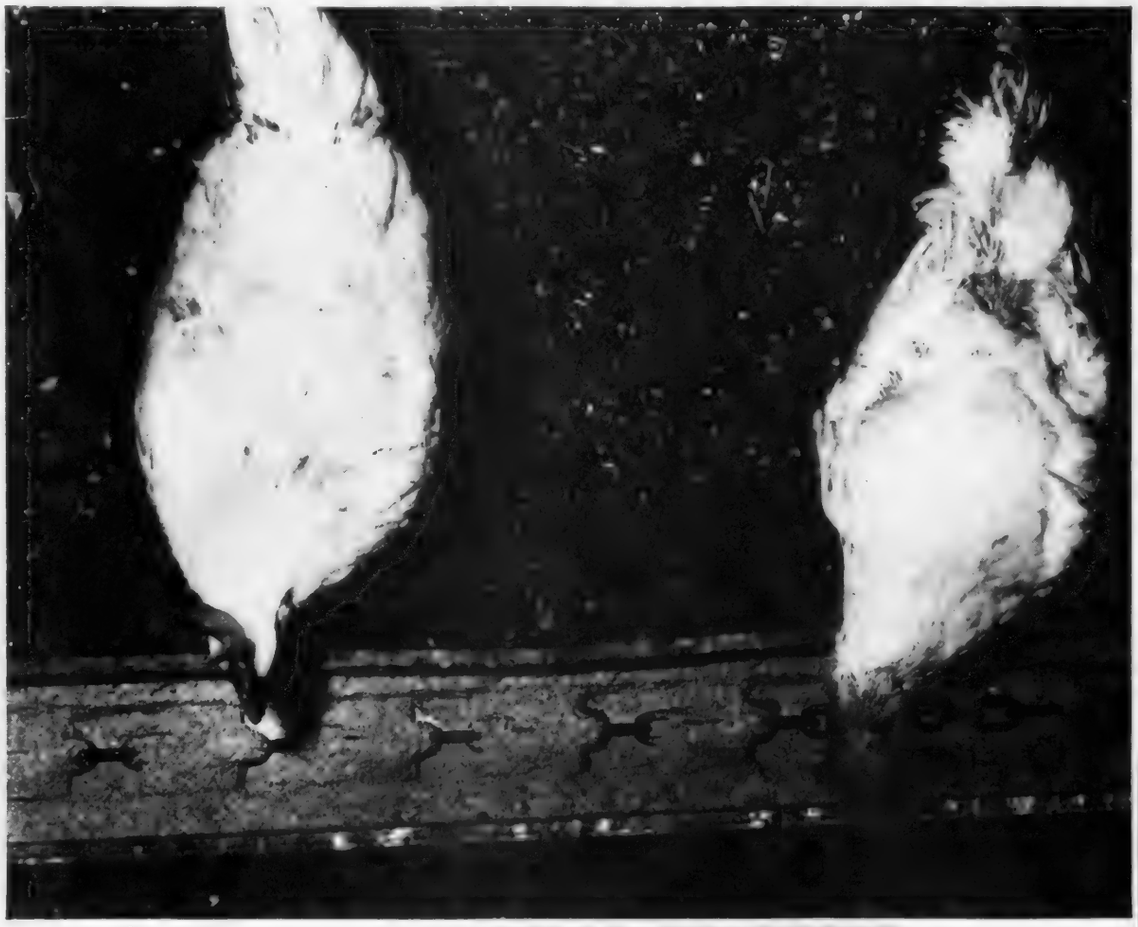
For feeding his herd of Brown Swiss, Hicks installed a silo unloader in one of his upright 150-ton silos, then built a 12-foot elevator to lift the silage up to an 80-foot feeding bunk. The grass silage is carried along the bunk by a continuous chain much like the type used for moving manure back to the beaters in a manure spreader. Strips of angle iron mounted on the chain give the "bite" that picks up the silage. A one-half horsepower motor drives a Flinchbaugh wagon unloader which is used as a reduction gear and is mounted in the haymow overhead; it moves the 2 tons fed daily at a cost of about 25 cents.

In his chicken operation Hicks has around 1200 layers and 100 roasting roosters. They are fed 10 times a day between 5 a.m. and 6 p.m. with a 15-minute run of a Buckeye Incubator chain-in-trough feeder. The feeding operation and the 200-foot moving chain are operated by an electric time clock.

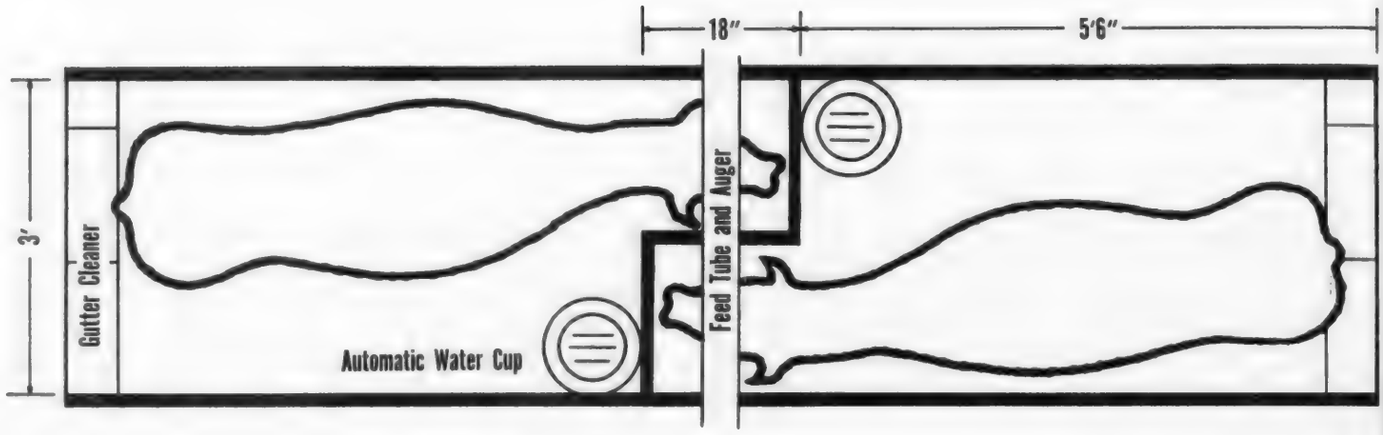
How much time has automation saved Hicks? Before the dairy and chicken operations were streamlined, Hicks needed the help of two men. Now he has only one helper and they get along fine.

William H. Hicks of Tyrone, Pennsylvania

2



There is plenty of room for each layer to pick up feed from the 400 feet of moving chain (above) in the Buckeye feeder trough. The Flinchbaugh wagon unloader (right) is used to drive the silage feeders in the bunk below. Hicks points out the shear pin safety device that shears before the chain breaks in case of frozen silage. The Hicks Brown Swiss are big, rugged, and well-fed, with plenty of grass silage in their automatic feeder bunk.



3 Fifty animals are fed six times a day without a human hand being turned at Conner Prairie

TILLMAN BUBENZER, manager of Conner Prairie Farms, Noblesville, Indiana, working with B. B. Winter, an Illinois farmer-inventor, has devised the first full-scale automatic feeding operation for cattle.

In Autumn, 1957, FARM QUARTERLY published, "Feed a Little a Lot." This article cited University feeding trials which proved that feeding the same feed in smaller "helpings" spread over a longer time, greatly improved feeding efficiency and gains.

The stall plan of the Conner Prairie operation is shown above. The Masonite separators and feed troughs were installed in a dairy barn. The cattle are tied in these stalls during the entire feeding period. Grain is elevated to the loft and drops into the mechanized feeder. A time clock controls the geared motor which drives the 84-foot auger carrying the grain through a slotted tube. The same motor also revolves the tube to dump the feed into the troughs. The tube turns on ball-bearing skate rollers to a point where the slot allows the grain to drop like a miniature waterfall into each trough as shown below and on the opposite page.

Herdsman Fred Lemmon is playing it cautiously to avoid scours and bloat. The time clock is set to give the animals 5 feedings a day. At each feeding there are 4 "drops" of feed of ¾ pound each, giving the animals 3 pounds each 3 hours. At present, the feed is a 12½ percent protein ration of 800 pounds of corn, 800 pounds of cobs, with 400 pounds of supplement and mollasses per ton. The ration also contains vitamins A and D and Aureomycin.

The animals are the Conner Prairie cross of Red Poll, Angus and Santa Gertrudis. They were started at 400- to 500-pound weights and will be fed in these stalls for 5 months, when they will weigh 800 to 950 pounds and be a year old. The gain is expected to be 2½ to 3 pounds a day.

The final touch in completely automatic beef raising is to switch on the Jamesway gutter cleaner once a day. This tidies up the barn in about 10 minutes and puts the manure in the spreader outside.

THE LANCASTER COUNTY, PENNSYLVANIA, dairymen always have been quick to pick up anything new that will help them save time, or manpower, or improve the herd. The first artificial insemination association in the country was organized here in 1944 by county agent Dutch Bucher.

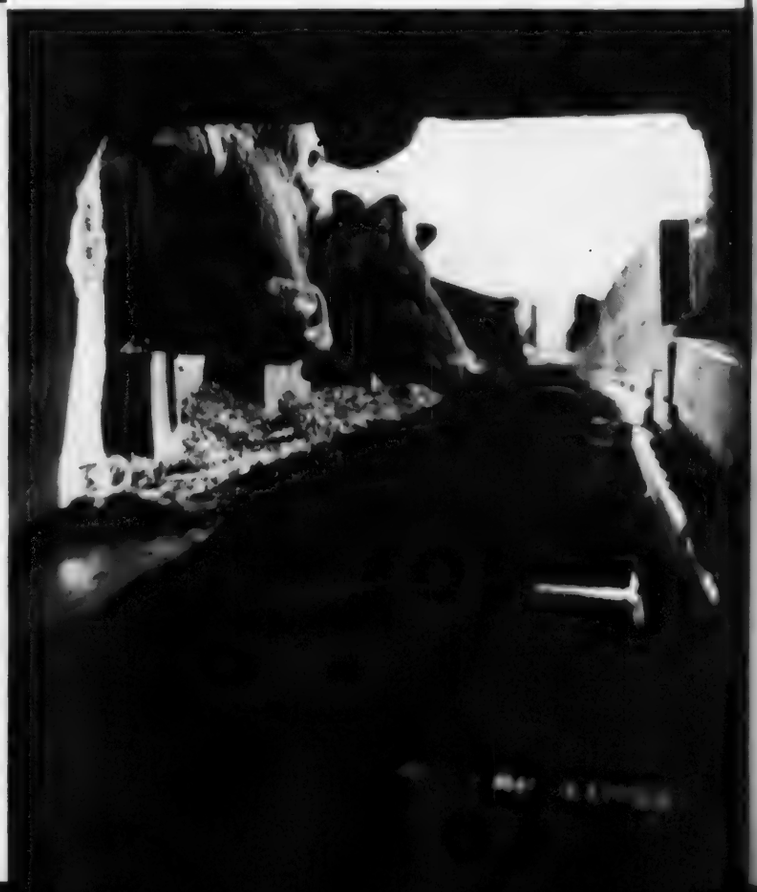
Today, just about every gallon of milk is picked up in bulk, automatic feeding from self-unloading silos is coming in fast, and manure spreading is one of the morning chores, thanks to barn gutter cleaners that drop the manure right into the spreaders.

The cornerstone of the new milk house on the B. Snavely Garber farm is inscribed, "Milk is First." The automation program on this farm includes a new Hinman pipeline milking system that drops the milk into a 500-gallon Wilson tank. The manure from the stanchion barn is taken out to the spreader by a Jamesway cleaner.

Modell Allred has just installed a bulk feed system which will supply pellets to the chutes that drop feed into the stanchions of the Surge milking parlor. There is a complete pipeline system including an automatic wash-up controlled by a Surge Electrobrain. The milk is cooled and stored in a Girton tank. Silage is fed from a self-unloading New Holland wagon into the bunks in the concrete barnyard.

The George Curme farm has completely automatic unloading of silage from the Harvestore silo. A Jamesway shuttle feeder spreads the silage onto the 100-foot bunk. Manure is brought out of the barn by a Jamesway gutter cleaner and dropped into a spreader. Concrete ramps make spreading possible every day in the year.

4 Automation on dairy farms near Lancaster, Pennsylvania.



Here's how three Pennsylvania farms have taken the drudgery out of dairying. Dick Mylan of the Queen Dairy (left) is pumping out the 500-gallon Wilson Cooler on the B. Snavely Garber Farm at Willow Street. (Below, left) Modell Allred has a Surge parlor and pipeline set-up, complete with an Electrobrain to do the wash-up. His farm is near Chatham. (Below) The cows line up on the George Curme farm near Cochranville at the sound of the electric silo unloader starting work. In a minute the paddles on the Jamesway shuttle feeder will be pushing the silage into the bunk.

KENNETH WALTERS is going straight toward complete automation on his 1,000-acre farm near Jeffersonville, Ohio. It is a hog operation with 20 sows farrowing every month with an average of 9 raised per sow. There are 2,000 hogs, more or less, going to market every year. A top weight of 210 pounds is aimed for after 5 months of feeding.

All the grain raised on the farm is put into the hogs. Between the time the seed is planted and the corn is ready to feed, the crop is given the full treatment with modern mechanical methods. It is sprayed, fertilized heavily, and at harvest time the grain is dried with a New Holland dryer.

The corn is put in ready-to-mix storage with a Drake elevator. From the bin the grain drops into a hammermill and mixer. One man can grind, mix, and load 1½ tons of feed into a Dodgen auger wagon, and have it out in the lots and in the self- feeders in 45 minutes.

In the photo (left, below), the wagon is on its way to fill the hog feeders.

(Right) A belt conveyor carries feed from the mixer to the wagon. (Lower right) The feeder wagon backs up to the hog house and fills the feeder with its auger elevator spout.

This is a transitional stage as far as automation is concerned. Next year, Walters plans to install a ¼-mile auger which will eliminate the wagon and carry the feed directly from the elevator mixing area to the self-feeders in the hog yards. The auger will take the same route as the wagon and will eliminate two operations: loading into the wagon at the elevator and unloading from it into the feeders.

Kenneth Walters' 1,000-acre hog farm near Jeffersonville, Ohio. 5

Turning the Worm

Lungworm of cattle, sheep, goats and pigs can be controlled with Dictycide, a new anthelmintic. Lungworms, which are usually worse in young animals, are coughed out after the injection. Hygromycin is a good long-term controller of hog stomach worms, but is not to be used in sheep or cattle. It is fed over at least a two-month period. For severe cases of hog worms, and for one-shot worming, piperazine is a useful drug. Sodium fluoride, calcium oxide, and calcium anthranilate all are poisons which successfully kill hog stomach worms—but must be used with care. For cattle and sheep, phenothiazine is the best controller of stomach worms—and lead arsenate for tape worms. Anthelmintics are poisons, and should be used with strict adherence to the label directions.

Turning the Worm

This twisting, stomach-turning mass is the result of lungworm infection of a calf. Thousands of the worms block the passages of the lung, strangling the animal's breathing, and finally causing permanent blockage. With Dictycide, new anthelmintic for lungworm, the worms are paralyzed, and coughed out. One 13-pound pig had more than 1,700 lungworms.

EVEN WORMS have worms.

No domestic animal—including man, escapes their slimy grip.

When they are few, they go unnoticed, passing their parasitic life in lung or intestine or migrating in the tissues and fluids of the body. The damage may be slight.

When they are many they can destroy the very host that feeds them. They gather in their myriads in the intestine, in slithering masses, irritate and invade the tissues, block the passage of food and lay eggs by the countless billions which pass in the feces to reinfect the same host and many another.

In the lungs they block the bronchial passage and the body's reaction cuts off the area, reducing fresh pink lung tissue to a swollen, rotting, oozing mess. And they breed. They lay eggs and their eggs hatch, sooner or later, depending on the species, and the young worms migrate to the intestine (or they may be coughed up and spat out or swallowed), yet countless thousands make their way to the outside, via some route, to another host, or to a reinfection of the unprotected beast that carried them.

Unprotected? Most animals have little, if any, specific defense mechanism against worms. Probably the best protection is a healthy animal. Even a healthy animal may have a few worms. Why they don't expand their numbers is not known. But when they do, lungworms or liver flukes, whip or nodular worms, strongyles or ascarids, they make a living meal out of the animal they choose as host.

Once the worms have overcome the first resistance of the animal, they build up their numbers until the very weight of them is astounding, and their effect is worse. Once they have become a nuisance, they must be checked.

Prevention is better than cure—and if the cycle of ingestion, development and fecal escape could be broken, worm numbers would fall. But animals infect their own dinner plate. Parasite eggs and larvae fall in droppings onto the very ground—pasture or feedlot—that feeds the host.

Hygiene is important, and the animals can be moved to clean ground periodically. But a more usual cleanser is an anthelmintic. (*Anti*—against, *helmins*—a worm.) There are many, new and old, on the market, and the majority of economically important worms can be controlled.

Lungworms in All Species

Lungworms are common. Most species have them—the major farm animals and others—from cats and dogs to guinea pigs and mice. They are more common in the young animals but can occur later in life, such as in milking cows. As well as direct physical damage, they can cause allergies; act as the hosts or transmittors of viruses and bacteria; and at the same time cause damage which weakens the animal, making it less able to resist the diseases the worms bring.

The English discovered the first practical anthelmintic effective against the lungworm. This is Dictycide, discovered by Imperial Chemical Industries of Great Britain, and sold in the United States exclusively by Fort Dodge Laboratories, Iowa. It is new—released in England in 1957, in U.S.A. in summer of last year. The white crystalline powder is dissolved in distilled water and injected under the skin.

"It is available in England, orally administered," said Dr. J. C. Trace of Fort Dodge Laboratories. "But there are problems of stability here with this form, and until they are solved it will not be released by us for oral use."

Dictycide is effective against lungworms in many species. "Cattle, sheep, swine, goats, several wild animals of various types have all been tried," said Dr. Trace. "It apparently works in all species. Even buffalo were tried in Pennsylvania."

Calves are injected in the neck, pigs and sheep under or behind one of the front legs, and the dose is one cc. for each 35 pounds body weight. (A 300-pound calf would take 9 cc., about two teaspoonsful.) "It controls all the lungworms of importance in farm animals," said Dr. Trace. "The only lungworm it doesn't hit very well is found in sheep and goats and is not much of a problem. It controls all three species of worms found in swine, the only one in cattle, and two of three found in sheep and goats." Lungworms vary in size up to four inches long, and the sheep lungworm that escapes Dictycide's action (mullerius) is a minute creature.

Once injected, Dictycide is carried by the blood to the lungs, where it inactivates the lungworms. They are gripped by a sort of paralysis and are swept out of the lung by mechanical action of the fine hairlike filaments or cilia lining the air passages of the lung. Once they reach the trachea they are coughed up. The lungworms lie right in the passages of the lung—they don't have hooks or suckers, and in a heavy infection they completely block the bronchii.

"The coughed-up worms are not infectious and if eaten would have no way of penetrating the intestinal walls and returning to the lungs. They would go straight through the animal," said Dr. Trace. The peak of the action of Dictycide is within two to three hours after injection and the action will be essentially over in eight hours, he explained. And there is no effect to the animal from a normal dose. An overdose might cause nervousness and an extreme excess could cause convulsions and finally death—but "it is one of the safest anthelmintics available," explained Dr. Trace. There is no ill effect on pregnant animals and Dictycide is compatible with other anthelmintics, antibiotics and drugs.

If safe for the host, it's rough on the parasite. A 90 per cent kill is usual, and better than this is common. And lungworm infections can be heavy. Dr. Trace held out a bottle with 1,700 white, needle-shaped worms, two inches long. All came from one 13-pound pig. "In sheep the worms are big-

(*Continued on page* 114)

By Charles F. Rogers

HOW TO *LICK* the FORAGE PROBLEM

IF, ALONG ABOUT NOW, you are down to the bottom door of what had been a silo full of soggy, fishy-smelling silage, or if only a hundred-odd bales of last year's rained-on hay remain in the loft, you are not alone in your misery. As a result of last spring's wet weather, much of the hay and grass silage fed during the past winter was inferior. But farming always gives us another chance.

That chance is just ahead. Now is the time to plan for it. Spring usually dawdles along and then suddenly breaks through overnight and the time for planning has vanished.

Because of an article I wrote on wet, washy forages (Feeding Wet-Weather Forage, Winter 1959), I have received a number of interesting letters. Farmers wanted to know my recommendations for harvesting hay and silage. They wanted details. Some farmers of long experience questioned the wisdom of always making silage out of first alfalfa cuttings. Several livestock feeders wanted to know why they couldn't greatly increase the grains used as silage preservatives, thereby having a ready-mixed, complete ration. A Tennessee cattleman asked how he could reduce his silage-making costs, which were running too high. A Kentucky dairy farmer wanted advice on what kind of forage he should grow and whether pure stands or mixtures are better for silage. A Michigan reader asked my opinion of hay crushers.

I visited several of these farmers and in every case I came away having learned a little more myself, determined to pass along the ideas these inquiring-minded men had gained through experience. My purpose is not to offer the ABC's of hay and silage preservation, but to suggest a few improvements in standard practices that might point the way to better silages and hay for next winter.

Field to Feedbunk

Hay and silage operations on any farm where quality counts involve four essentials: good forage, proper stage of harvest, skill in preservation, and judgment in utilization. The first of these, good forage, is determined by an area, a farm, even a part of a field. Henry Long, who has a 30-cow dairy herd in the bluegrass region of Kentucky, asked what kind of silage he should make. I replied: The kinds that will grow best on your farm. The same applies to hay crops. Choose adapted crops, which means adapted to your area and to your particular soil. The naturally well-limed bluegrass region soils are suited to red clover and timothy on the uplands, with brome, ladino and alfalfa on the bottomland. But on your thinner, more acid and less well-drained fields, don't attempt the more exacting legumes; lespedeza and redtop will not give as good a forage but will give more of it. Utilize your soil to the utmost to produce quantity with relative quality so you can carry more animal units to employ your available labor efficiently.

Good and abundant forage is the key to success on this Pennsylvania dairy farm. They use both a baler and silage cutter. One full silo insures against a bad year.

Frequently a farmer will ask, "What crops should I grow for hay and what meadow crops for silage?" The assumption among many farmers is that the kind of meadow crops that make the best silage are different from those that make the best hay. A field that will make good hay will also make good silage, and the reverse is also true. With the exception of a very few minor crops, any grass, legume or small grain can be used interchangeably for hay or silage. Sudangrass is one of the few exceptions. It is a good pasture crop and fair material for silage, if cut early. But I consider Sudan poor for hay.

Most farmers who feed silage consider it the main portion of an animal's diet. Some farmers here and there prefer to use hay as the basic ration. Sometimes the lay of the land, regardless of the crop, limits the harvest. Farmers know from experience which of their acres are too level or too low for satisfactory drying of early-cut hay. Those are the acres to ensile. Or a farmer knows that hay dries very quickly on a part of his field that slopes to the sun. Such forage should be baled.

Use your best fields, sown to adapted meadow or grain crops. Good forage is the result of properly-chosen, well-fertilized plants, free from contaminating weeds. Alfalfa is, of course, the standard we go by, because of its high palatability, high nutritiousness and its ability to withstand repeated cutting each season for 3, 4, or even 15 years, if lime, fertility and climate are suitable. The clovers, medium red, Ladino and others where corn is grown, with crimson and other annual clovers in the south, are next choice. Some grasses, timothy, brome, orchard, bluestem, or Bermuda, have their areas and all make satisfactory hay or silage. Newer grasses like Kentucky fescue or newer legumes like Caley peas are filling in where older crops fail. Caley peas have been a boon to farmers below the Cumberland River. This annual, similar to the sweetpea, yields 4 to 6 tons of hay or silage on the more difficult southern soils. No other legume excels it in nutritive properties or palatability. Once seeded, it volunteers for years.

What about grasses and clovers in mixtures? Grass has a reputation, and I think it has been earned, of improving the quality of silages and of aiding the curing qualities of legumes in hay mixtures. It has been my observation, however, that it is easier to make good silages from a pure stand of legumes than from a mixture. It is most difficult to make a good silage from a straight young grass like bluegrass or orchardgrass unless it has been well wilted.

Most clovers and grasses, except for southern annuals, must, of course, be sowed prior to the year of harvest. Spring-sowed grains offer hay or silage possibilities the same season. So do soybeans and Sudangrass, often a popular emergency combination. I do not recommend interplanting them. Weather or fertility may favor one or the other in a mixture, which may prove disappointingly out of balance. Better proportions come from mixing at the silo, soybeans and Sudan crops that have been grown separately, preferably in cultivated rows. If the two crops are alternated in strips about 12 or 15 rows wide so they can be cut and blown into layers in the wagon, mixing is easy as the wagon is unloaded. Mixtures of legumes and small grains are a different matter. Grain can be interplanted in meadow crops, barley in alfalfa, oats in vetch or peas. Such combinations are primarily for silage. The quality of each crop is mutually improved and further preservatives are unnecessary.

John Stahr, near Wooster, Ohio, had sweetclover come up so thick in a fine stand of wheat that the grain could hardly be seen as harvest approached. He wondered how he could separate the grain from the clover. On my recommendation, two weeks before combining, he chopped the two crops together. Despite the amount of straw, it made fair silage, reasonably palatable and high in feeding value and gave him more returns in milk than if he had sold the grain and hayed the clover. In this instance, the grain was intended as a nurse crop for the sweetclover.

A reversal of this is to plant grain in an established meadow. In Kentucky and Tennessee, it is a frequent practice to disk alfalfa fields lightly in the spring, sow barley, then ensile the two together when

the barley is in the soft-dough stage. John Biernink of Bell Buckle, Tennessee, regularly harvests silage of spring-seeded barley in his alfalfa. He cuts each year about the end of June. The alfalfa grows right on. No wilting is needed with such companion-crop silage which should be cut direct when the crop has reached a dry-matter content of about 30 per cent. The combination of soft, young legume and the more fibrous, dry grain can be fairly well controlled in timing for satisfactory moisture. Wilting would make the material too harsh.

When to Harvest

Every farmer knows that young, tender forages, cut before the bloom stage, make the best hay or silage. But most farmers can always find an excuse for delaying the forage harvest, and over-ripe, stemmy, discolored roughage results. The time to cut for silage or for hay is the same. Protein and palatability are highest in young crops. There are other advantages which the chemist cannot measure.

First cuttings have virtues that later cuttings lack. We don't know just what they are. We can't describe the chemical factors that cause it, but the common experience of many men who have watched the productivity of their feeds attests to that extra something in the early-cut roughages. *Early* means before the flower buds show. The soft stems and more abundant leaves at that time will produce material of higher digestibility. The manager of the Walker-Gordon Farms, which operate dairies in New York and New Jersey, once told me, "First-cutting hay and silage has milk-producing qualities that the protein content alone does not provide. It is a mistake for farmers who buy hay to discriminate against first-cutting hay because later cuttings are more weed-free."

Early harvest usually means greater weather risk. My advice is to take weather forecasts seriously. We remember the times they were wrong, but we tend to forget that forecasts are for sizeable areas, a county, a geographical district. Usually, for an entire area, forecasts are most often correct. Study your weather patterns. In the Corn Belt in late May there is 1 chance out of 2 that there will be no showers on any one day during working hours. From one morning to the next, the chances of no rain are 1 in 3. There is 1 chance in 4 that no showers will occur from one morning until the next evening. The chances from the middle of May until the end of July for 3 consecutive days without rain are nearly 1 in 15. By starting early, the risk can be spread. That way you'll get some good, some mediocre, and some poor forage. Not all the forage will be harvested at the ideal stage, but none will be so matured as to have passed its usefulness. Some farmers deliberately delay their first cutting in order to get bulk. They also point out that by delaying the first cutting until about June 10, the second cutting comes more quickly and also more abundantly. This is true, but they are sacrificing quality in order to get quantity. You will get less hay by cutting early, but the chance is very small that you will lose any productiveness when you feed that hay as compared to feeding more pounds of a poorer, later-cut hay. If alfalfa is your crop, choose a variety, adapted to your area, that will survive early cuttings. Ranger alfalfa, adapted to the southern part of the Corn Belt, is capable of withstanding very early harvest.

In the Mow or in the Silo?

One recent letter writer, James F. Deal, was well worth visiting. He is the farm superintendent of Mayfield Dairies of Athens, Tennessee. Of their 850 acres, 650 acres are under cultivation. They carry 225 animal units, all Jersey cows with 9000-pound or better milking averages. Except for a minimum of purchased concentrates, all feeds are home-grown, which is not typical of large herd farms.

Common practice on most farms is to make silage early in the season, letting the hay operation await better weather. This is not so at Mayfield Dairies. Their method is one to recommend. When I asked Superintendent Deal what prompted his decision as to whether to bale or ensile a crop, he said, "Ours is a stand-by operation. When we plan to cut hay, the forage chopper is kept waiting, just in case. If the cut forage doesn't cure quickly, if the humidity changes or rain threatens, if the windrows get wet, what was intended for hay goes in the silos instead. By the same token, if we plan to chop a crop and the weather stays nice, the hay baler is ready. We expect quick switches in early spring, so we plan mow- and silo-storage space accordingly."

Economists say it requires only 33 acres of silage cropland cut three times a year to justify ownership of a forage harvester. In purchasing one, I would see to it that I had ample power to run it for fine chop in heavy going. I would want a grass pick-up attachment for wilted crops. On stony fields, I would cut direct, for a sickle bar will pass over stones that a pick-up will gather. In going through a silage chopper, a granite stone the size of a grapefruit can cost the value of many tons of silage in repairs. I would prefer a windrowing rake to a windrow attachment for the mower. Raking requires a second operation, but a wider swath is handled. Windrowers give trouble on the turns and are of little advantage in small fields.

Conditioning Hay

The best man at haymaking I know is Paul Schentius of Erie County, New York. His hay has taken so many prizes at fairs that he has become a little unpopular among the competition. He feeds hay as an adjunct to silage rather than the reverse as most do. He cuts early, then immediately uses a hay conditioner. Raking into windrows is done the same day. The hay is usually ready to bale the following day. Unheated forced air is used for final barn curing. A similar routine is followed by thousands of farmers who never achieve

any but mediocre hay. It is the MAN in MANagement that makes the difference.

Hay conditioners are invaluable. Some crush the hay between smooth rollers. I prefer the type with corrugated rollers, called crimpers. In the first kind, it is necessary to use great pressures to break the stems longitudinally. When coarse stems go through, small stems don't get crushed. The crimper is more likely to press the forage into many bends, with greater splitting.

The purpose of all hay conditioners is to reduce drying time, which not only speeds up the operation but lessens the threat of bad weather. One of the troubles of drying a crop is that the leaves dry so rapidly that they break off before the stems have a chance to lose their moisture. The reason is that a forage plant is similar to a water pipe in construction. It takes a long time to dry the water out of a pipe if the water has to pass through the pipe walls. If the pipe is broken open at intervals, the water escapes rapidly. Water evaporates slowly through the living tissue of stem walls. It takes time for the moisture to go through 6, 8, or 10 inches of plant cells to reach a cut end of a stem. If the moisture has to move only a 16th of an inch to a crimped break in the stem, drying is greatly hastened. Crimping so improves the quality of the crop that it is my belief that if a farmer has sufficient acreage to justify owning haying equipment, he cannot afford to be without a hay conditioner. It can increase the rate of recovery of a field

(*Continued on page* 124)

Hay conditioners split the stems lengthwise (far left) permitting the juices to evaporate from the stem before the leaves shatter. Windrowing the forage (left) is an aid in curing. One driver, two tractors (below) lets a man get a drink between loads. Packing the silage is essential whether it is stored in a trench or in an upright.

Farming with Plastics

Plastics have replaced metals for countless uses on farms. And many brand-new uses have been found for these adaptable materials.

ALVA STURGEON and his brother Howard have 6,000 bushels of corn in their cribs at Oxford, Indiana. "We're not the least bit worried about the price we're going to get for it, or acreage quotas, or price supports," says Alva. "Before we planted the crop it was contracted for, at a good price."

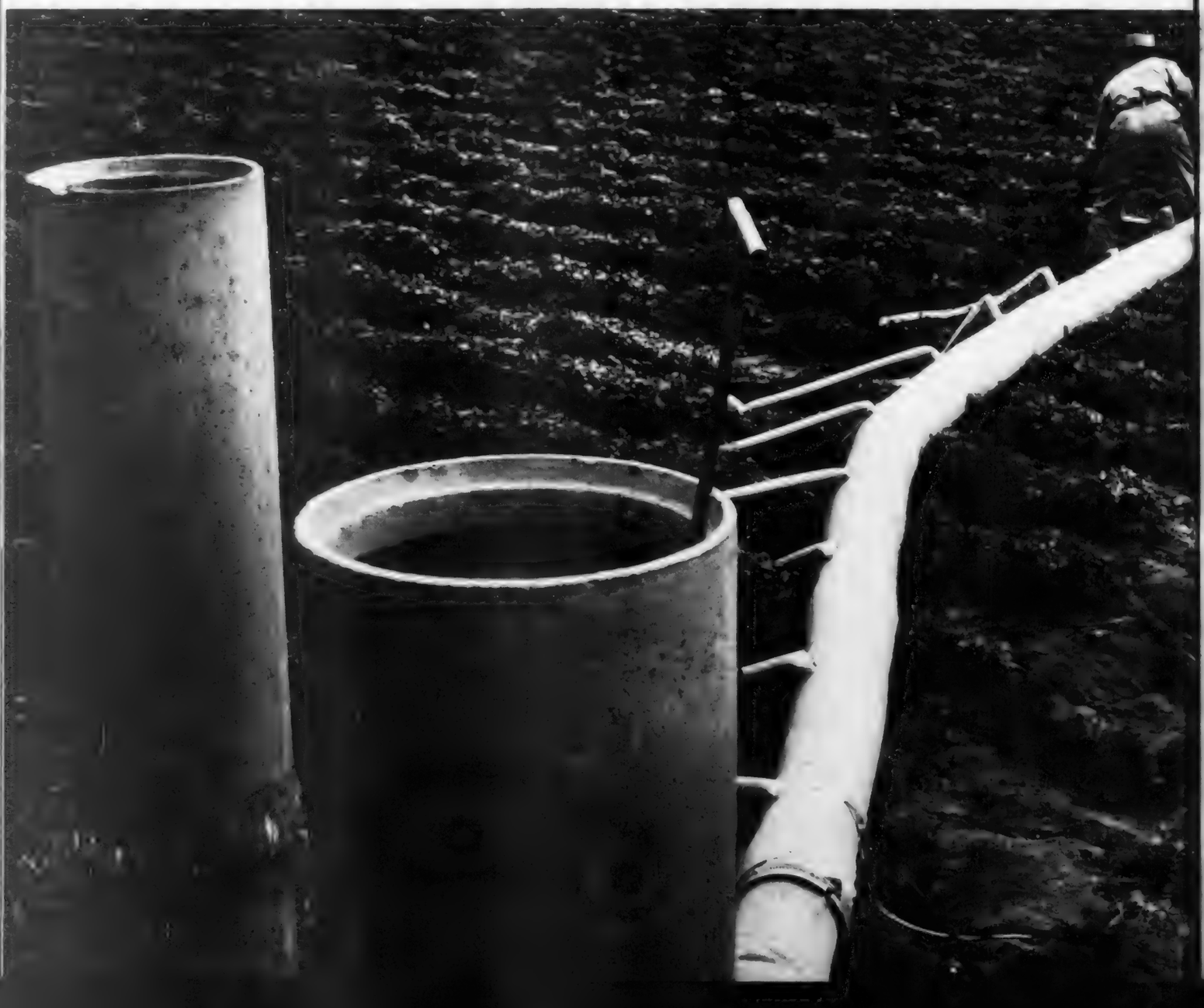
The corn is amylomaize, one of the newest sources of plastic. Amylomaize is only one of a great number of recent developments in the plastic field which is helping the farmer do a better job at less time and very often at less cost.

They say plastics got their start 90 years ago when celluloid was developed to counter the shortage of ivory for billiard balls, and the first on-the-farm use of plastics was the celluloid collar for the farmer's neck and a celluloid comb for his wife's hair. Celluloid was made from cellulose and was close cousin to nitro-cellulose, an explosive which replaced gunpowder for cannon. The celluloid wasn't explosive, but it burned vigorously and grandfather had to be careful when he lit his cigar. Bakelite, made from phenol and formaldehyde, for electrical parts, came along in 1909.

The first plastic to be widely used was cellophane, also made from cellulose. It wasn't cheap and its uses were limited to packaging, display, and perhaps an occasional patch for a broken window. Plastics for general use on the farm, either as a substitute for other materials or new uses, were not manufactured in quantity until after the last war.

The quality of plastic itself had been continuously improved. The raw material from which plastics are made generally are cheaper and more plentiful than either metal or wood, and while all plastics are complex chemical compounds, they are easily fabricated and worked. There are more than 25 basic plastic families.

Formerly limited largely to cellulose as a base material, the in-



dustry now has a half dozen or more sources, most of which are less expensive than the substances which they replace. Many of the base materials are by-products which formerly went begging for uses. Good practical plastics are now being made from organics which bear fancy chemical names such as polystyrene, polyesters, polyethylene, vinyls, urea and melamines, phenolics and other tar acid resins, and our old friend, cellulose.

Polyethylene, for example, is made from a by-product of the refinement of ethylene gas and its supply is almost unlimited. Cellulose is found in almost everything that grows, and its supply is constantly being renewed with every crop year. A case in point is the amylomaize grown last year by the Sturgeons. Amylomaize is high in amylose, similar to cellulose. Plastic made from amylose can be dissolved in water; vegetables wrapped in amylomaize plastic can be popped into the kettle, wrapping and all. Possible uses for amylose plastic are coatings for furniture, yarn, and wrapping for vegetables. An apple covered with this plastic will remain fresh almost indefinitely; the wrapping can be eaten with the apple and as a starch derivative, will have food value.

The Sturgeons are enthusiastic about amylomaize as a crop. "We got about the same yield as we did on our regular hybrids, about 90 bushels to the acre," Howard Sturgeon said. "The only fault we found was that there were two or three maturing dates represented, but the breeders say that will be ironed out soon. Our crop is going into the laboratory to continue the testing work. It will be three or four years before the seed is stabilized and its commercial possibilities known. There will be no commercial seed next year."

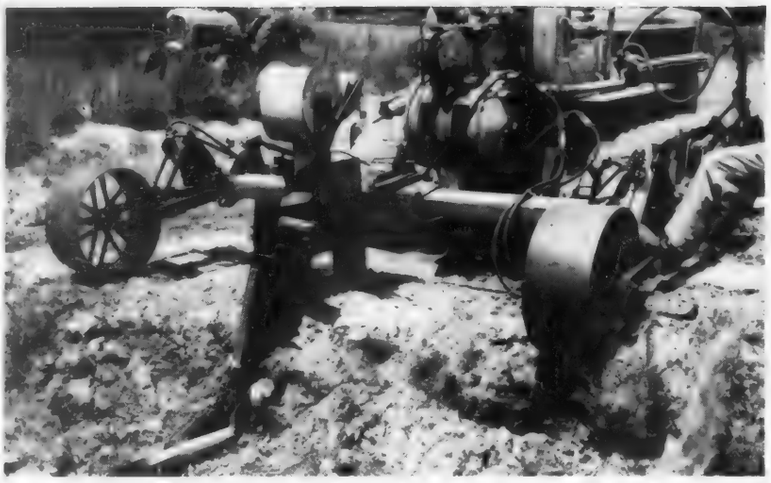
The raw materials for plastics are supplied to the industry by relatively few big companies. Among them are Allied Chemical, Dow, Du Pont, Eastman Kodak, Goodrich, Goodyear, Hercules, Koppers Co., Inc., Monsanto, Olin-Mathieson, Phillips, Rohm & Haas, Spencer, Union Carbide, and U. S. Industrial Chemical Co. These sell the basic materials to processors who make their own formulations and fabricate their own particular product. There are countless combinations of materials. Each processor has his own secret or formula for making a better or different product.

The problems of producing plastic products for the specialized farm market have been solved to an amazing degree. Everyone remembers the first plastic hose which worked just fine in warm weather but was likely to become a mess of small pieces if handled after a freeze. Plastic hose now on the market remains pliable, can withstand all ordinary extremes of temperature, and is as tough as a rhino hide.

The transparent sheet plastics are almost all subject to deterioration from ultraviolet rays and from oxidation in the open air. This was, and is somewhat today, a problem, for a transparent plastic is necessary for greenhouse construction, as a substitute for glass in windows and pipes, and other uses. However, many new transparent films are now being made which have high weatherable qualities. The simple addition of lamp black (carbon) to a plastic increases its lasting qualities in the air fourfold, and adds very little to the cost.

One of the cheapest plastics is polyethylene. This plastic is top seller now for film and sheeting for agricultural uses. Vinyl film has farm uses, but is a poor second. Somewhere in the rear are the polyesters and other polymers. For purposes other than mulching, where polyethylene leads, and pond and irrigation ditch lining, where vinyl leads, the market for farm uses is divided among other plastics. Special types are required for such things as bearings, protective coverings, machine parts, and containers.

A flexible plastic irrigation pipe (left) carries a high volume of water for as far as a mile to distant fields, substituting for an open ditch. In the fields, outlet pipes distribute water to each row. Sections are self-sealed by pressure. Zero temperature outside condenses moisture in the open door of a plastic greenhouse (right). Growing temperatures are maintained inside with a small heater. Note the inexpensive construction and the double application of film for insulation.



A plastic drainage pipe, shaped by a simple tool behind a subsoiler (above), replaces old-style tile at a fraction of the cost for labor and material.

A butyl bag with a plastic lining (below) will convert an ordinary truck into a tank truck for hauling milk and other potables. These bags hold up to five thousand gallons.

A pond liner of bonded plastic strips (below) is being put down on the bottom of a newly-excavated pond. It will be anchored by soil on the edges and will eliminate seepage and weeds.

The use of black plastic film for mulching, developed largely by Professor E. M. Emmert at the University of Kentucky, is rapidly taking the lead in sales for on-the-farm use. Its use by melon growers, market gardeners, potato and tobacco growers has expanded so speedily that many believe plastic mulch will eventually be used for almost all specialized crops. Hawaiian pineapple does especially well with a plastic mulch; here the potential is 8,000,000 acres. Thousands of acres of rice are now under plastic in Japan, and Japanese agricultural officials say the entire crop will go under plastic as soon as it is available.

Black polyethylene, 1½ mil in thickness (a mil is about 1/1,000 of an inch), has been found to be one of the best for mulching. It comes in rolls 2,000 to 3,000 feet long and in widths from three to eight feet. If care is taken it can be used two or more years. "I have tried thinner film," Dr. Emmert says, "but while it was satisfactory as a mulch, it couldn't stand the punishment. I've used the 1½-mil film the second year, planting the crop through the old slits."

The cost of mulching an acre with 1½-mil plastic with solid coverage is about $150 to $200, which is a fraction of the increased profits. The plastic costs one-half cent per square foot for 1½ mil; ¾ mil costs one-quarter cent. If wide-row crops are planted, the cost per acre is reduced.

Mulch-laying Machine

While the film can be laid by hand, this is practical on small plots only. A mulch-laying machine can be built with parts from a conventional cultivator. Two disks on this machine open small furrows in the soil into which the edges of the film are pressed by rubber-tired wheels. Two rear disks move the soil back over the edges to hold the film in place. The mulch is laid prior to planting, even the fall before, and slits are cut in the film for planting. The Bakelite Company, 655 Madison Avenue, New York 21, New York, and the Horticulture Department, University of Kentucky, Lexington, Kentucky, have plans for a mulch-laying machine. Mulch-laying attachments for tractors are made commercially by Howlett Bros. & Hackney, Gregory, Mich., and Engine Parts Manufacturing Co., Cleveland, Ohio.

Large seeds can be planted with a "jobber" which cuts a slit as the seeds are dropped and covered. If the crop is a replant, slits are cut and the plants set in. Irrigation water goes in through slits at intervals. Liquid fertilizer is also applied in this way.

Advantages of Film Mulching: (1) Controls weeds effectively in the row, with no danger to crops from use of herbicides.

(2) Increases soil temperature 5-15 degrees, forcing seeds to germinate faster and plants to grow faster because of increased nitrification and heat. Planting can be as much as two weeks earlier; crops will mature as much as two weeks earlier than in conventional planting. This means a mulch-planted crop will beat a conventional planting to market by four weeks.

(3) Reduces crusting and packing of the soil, resulting in less seed rot and a much better stand under adverse weather conditions.

(4) Greatly lessens water loss. Permits furrow irrigation on porous soils. Only about one-third as much water needed as for rotary sprinkler irrigation.

(5) Reduces disease because of less spattering of soil-laden water on the plants. Plastic-covered rows prevent ground-spotting of fruits or pods.

(6) Speeds up bacterial action in the soil.

(7) Crops are clean, free from soil and diseases resulting from contact with soil.

Disadvantages: (1) More expensive than herbicides if one considers the cost of the plastic and the labor for laying, unless the plastic is used more than one year.

(2) Soil may become too warm during summer with subsequent injury to seeds and plants.

(3) Necessary to make slits before planting or seeding; a hand corn planter (jobber) has been used effectively.

Reports of increased crops and profits from film mulching have been remarkable. Willard Wiltse, of Pinckney, Michigan, says of his mulch-grown melons, "I got more than double my usual yield under plastic mulch, and what's more, the melons came on two

With below freezing temperatures outside, lettuce thrives in a field greenhouse with no artificial heat. This was photographed in January. Note the double sheet of polyethylene directly over the plants and the wire wickets to provide extra air insulation. This greenhouse was constructed of tobacco stakes which cost five cents each.

weeks earlier, which gave me a nice premium on the market. My labor cost for weeding was cut almost to nothing."

Dr. E. M. Emmert, Lexington, Kentucky, beat the green bean market by two weeks, harvested one-third greater crop. The Rayner Brothers, Salisbury, Maryland, matured a crop of strawberries in 48 days with black Visqueen polyethylene. Free from rot and dirt, the berries topped the market.

Greenhouses

The use of plastics has revolutionized the costs of conventional greenhouses, and brought into common use the so-called field greenhouse, developed at the University of Kentucky by Dr. Emmert. He built his first plastic greenhouse of cellophane in 1934. A plastic greenhouse can be built for as little as 10 per cent of the cost of a glass greenhouse, and fuel consumption is about 60 per cent of that with glass. Moisture retention is much higher than with glass. The polyethylene film commonly being used for greenhouses costs ¾ cent per square foot while glass costs 15 cents per square foot. Because of the flexibility and light weight of plastic, the frame can be lighter, and both the lumber and construction can be of the rough variety. Light transmission is about 90 per cent that of glass.

The most popular film for greenhouses has been 2-mil polyethylene. It has the great virtue of being cheap, but the great fault of having only a short life; ultraviolet rays and oxidation require its renewal every year. Increasing the weight of the film does not increase its durability when exposed to air and sunlight. There are other films more durable, but all are considerably more expensive. Dupont's weatherable polyester Mylar lasts four years or more, but costs ten times as much. Eastman is experimenting with a weatherable cellulose base film called Tenite. Others announce experiments with a new weatherable polyethylene which will be comparatively cheap.

Greenhouse film comes in rolls of varying widths and lengths. One roll 4½ feet wide and 900 feet long will cover with two layers of plastic an 18-foot x 40-foot frame with a 10-foot gable. A 200-foot roll of the same width will cover with two layers an 8-foot

(*Continued on page* 167)

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(Continued from page 63)

test of twenty-five hybrids averaged twenty-seven per cent stalk breakage but thirty-six normal hybrids averaged fifty-seven per cent stalk breakage."

Dwarf Silage

The compactness of dwarf plants gives the foliage the appearance of being more dense than it is. Characteristics of the leaves, among them the ability to stay green longer, point to the possibility that dwarf corn might be superior as silage. John V. Brewer of McCook, Nebraska, had difficulty harvesting his dwarf plots because the ears were placed too low on the stalks. He turned cattle into the field. They cleaned up the dwarf plants completely before working on the standard corn.

Since as much as 70 per cent of the corn produced each year in our northeastern states is ensiled, dwarf corn research there has emphasized silage possibilities. In a silage trial at Feeding Hills, Massachusetts, the green weight yield per acre of dwarf corn exceeded that of counterpart standard hybrids. In stalk weight, green or dry, the standard hybrid was heavier, but the dwarf excelled in green and dry weight of both ears and leaves. The dried leaves and ears of the dwarf weighed more than the entire dried plant of the standard corn. That was one test. In other silage tests, weight results have slightly favored standard hybrids, but in all trials, the high proportion and quality of leaves reported would indicate that dwarf corn is likely to make highly digestible silage.

It has been felt that weeds would "take" short corn because of less shading in and between the rows. Reports from 1958 growers do not affirm this belief. In an Aurora, Illinois, test plot, one spraying with 2,4D with no cultivation, kept weeds in check. High plant populations, in the neighborhood of 20,000 plants per acre, have served to keep weeds down in other tests. The later cultivations possible with shorter corn also aid in weed control.

The seed is scarce. Pfister Associated Growers, with headquarters at Aurora, Illinois, will have some of the brachytic hybrid seed available in small amounts for farm trial. The price will be about 50 per cent above regular seed costs. Eastern States Farmers Exchange, West Springfield, Massachusetts, sold a limited quantity for 1959 planting. From all sources, there will be enough seed to plant between 50,000 and 60,000 acres this year.

Other dwarf corn features, good or bad, have yet to be conclusively demonstrated. It is thought that the smaller plants might need less water and fertilizer. No one has so far given proof. At present, recommended row spacing and fertilizer application are the same for dwarfs as for regular hybrids. Nor has ease of harvesting by

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Ray Johnson, Stuttgart, Ark., uses B.F.Goodrich tires on 6 tractors, says: "Special Service tires pull better because they stay clean in my fields."

Clifton Churchey, Sharpsburgh, Md., likes B.F.Goodrich farm tires so well he uses them on 4 tractors, 3 trucks, a baler, manure spreader and grain drill.

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corn-combine been effectively tested. Higher plant population, in the few instances where tried, has had conflicting results. Because of less shading, interplanting with forage crops such as alfalfa is expected to produce superior stands of the forage crop.

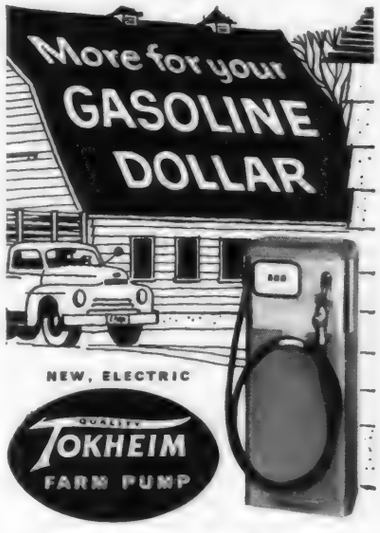
In their disfavor, plant breeders caution that dwarfs have not yet been thoroughly screened for disease resistance. Some of the material used to introduce the brachytic character has been rather susceptible to helminthosporium leaf blight. Also, because most dwarfs at present have upright ears, they might be susceptible to greater weather and disease damage.

Some plant breeders also feel that the dwarf is prone to outcrosses which give normally tall plants in a dwarf field—similar to the rogues in hybrid sorghum. It will take greater care in protecting the breeding stock to prevent this.

What They Say

Farmer reaction has been mixed. Charles J. Hulse, Westport, Indiana, said, "The dwarf picks easy. It stood up 100 per cent." Kermit E. Esrey, St. Joseph, Illinois, reported, "Field loss was extremely low for the dwarfs. They also caused no trouble in the picker, while we had considerable difficulty with the regular hybrids the same day because of dryness, with stalks accumulating in the elevator and husking bed." R. E. Dagner of Assumption, Illinois, felt differently. He said, "The stalks are too short and break off in the picking roll. The dwarf looked better than it yielded." A southern farmer, Charley Davis of Pollocksville, North Carolina, who grows about 400 acres of corn each year in the coastal storm area, said, "I want short corn, but the dwarfs we now have are too short. Corn breeders have overdone it. These dwarfs will stand our hurricanes all right, when other hybrids go down in a tangled mess. But my picker-sheller doesn't get all the ears, especially those with tips resting on the ground. Still, I don't mind a slightly lower yield from the dwarfs because they stand until I get around to harvest."

Corn breeders do not expect dwarf hybrids to push our current hybrids off the land. Research men believe dwarfs will eventually have a two-fold place in agriculture. John C. Anderson of Rutgers University, New Brunswick, New Jersey, stated, "A crop that can be left standing in the field longer takes advantage of a higher rate of drying. This gives less chance of spoilage when cribbed at a lower moisture content." E. C. Rossman of Michigan State University, East Lansing, Michigan, views dwarfs as the answer to environmental conditions like the loose muck soils of Michigan where normal hybrids grow very tall and are seriously subject to root lodging in even mild winds.



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The new pre-inoculated alfalfas

Newest benefit for Midwest alfalfa growers is NOCULIZED seed that comes already inoculated.

TRADE MARK

By Ken Erickson

LEROY GRAESSER helped his tractor driver dump sacked alfalfa seed into the planter one day last spring, then told the man, "Okay. Let her roll."

"This stuff hasn't been inoculated," protested the surprised driver.

"I know," said Graesser, manager of West Amana Farms—one of the seven farm departments in the Amana Colonies of Iowa. "But the tag on the sack says not to inoculate it—just to plant it as is. I don't know what it's all about, but from what I know of Northrup King, they know what they're doing. Let's try it and see what happens. It'll save us a lot of time and mess, anyway."

What happened, as Graesser describes it, was "an outstandingly good stand of alfalfa." But it wasn't till a Northrup King research team came to call that he learned the secret. The seed was already inoculated *before* he bought it . . . inoculated by Northrup King's new NOCULIZED process of placing live, effective strains of nitrogen-fixing bacteria *inside* the seed where they remained alive for months.

Graesser and the research team dug plants at random in the field. Every plant showed good root nodulation. "Better nodulation than we get from seed inoculated here on the farm," said Graesser. "We seed 300 acres of alfalfa a year, here, and this field is about the best one on the place." (Typical good root nodulation of NOCULIZED alfalfa seedlings is shown in picture at top of page. Pencil points to nodules.)

Proven on 10,000 Acres

The seed Graesser planted was part of more than 140,000 pounds of Northrup King NOCULIZED alfalfa distributed throughout the Midwest last spring. Enough seed to plant 10,000 acres, this was the most extensive on-the-farm test of a new alfalfa seed development ever made. It culminated nine years of work to find a practical method of pre-inoculating legume seed.

Tests of every conceivable kind had been made and re-made before the massive farm trials. And when the results were in the answers were: NOCULIZED works. The bacteria inside the seed coat not only live through changes of temperature and environmental conditions for months, but the seed's vigor and strength of germination is completely unaffected. NOCULIZED eliminates the need for on-the-farm inoculation, saves time and mess, does not affect plantability. It assures more uniform nodulation, more nitrogen build-up and better alfalfa stands than uninoculated seed.

New Concept

Alfalfa growers are as aware of the problems of on-the-farm inoculation as they are of the reasons for doing it. To be effective, bacteria have usually been applied wet in a messy, time-consuming chore that often left seed sticky, lumpy and hard to plant.

Northrup King's new NOCULIZED process puts the bacteria *inside* the seed. Here are the basic steps: First the seed coat is processed to make the seed coat more permeable. Then a liquid suspension of selected, known-effective bacteria strains is applied to each seed. A vacuum is created which forces these bacteria inside the seed, and finally, the seed is dried, bagged and stored, ready for planting. Unlike seed inoculated on the farm, NOCULIZED seed flows through the planter just like un-inoculated seed, and yet guarantees the farmer that every seed planted is inoculated.

Commercially available for the first time in 1959, NOCULIZED seed will be distributed initially only in the Midwest, because of limited processing facilities. However, it will be nationally available in 1960.

If you're interested in finding out more about NOCULIZED alfalfa seed, write me for more facts. Address: Ken Erickson, Northrup, King & Co., Minneapolis 13, Minn.

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ANSWERS TO YOUR FENCING PROBLEMS

(*Continued from page* 67)

Then you unroll the fence to the next brace, corner, or end post. Erect a dummy post for attaching the stretcher and stand the fence up against the line posts and corner or end assembly, holding it in place with loops of wire or string. The stretcher is then attached and the fence is stretched until the tension curve in the wire is reduced to around half its original size.

Each line wire is then stapled to the end post and the stay wires past the end post are removed. The middle line wire is cut, wrapped around the post and spliced back on itself and this same thing is done with every other wire working toward top and bottom (see drawing on page 67). Finally all the remaining wires are cut and wrapped, leaving the top line wire until last.

This business of wrapping the wires around the post is most important. If the fence is merely stapled to the end post, either the staples will pull out or the contraction of the fence in cold weather will cause the end post to turn.

I'd like to add something here about stretching fence with a tractor. I know that the general advice is never to use a tractor to stretch fence. It is dangerous and you can stretch it too tight. But I have found that in stretching a long span my men and I have a hard time getting that fence off the ground and up alongside the posts. The tractor is mighty handy to help in doing this. So I use the tractor to pull the fence off the ground, and take up most of the slack, then I complete the stretch with my ratchet stretcher attached to the tractor.

I'll repeat the warning: Don't use a tractor to stretch the fence but as a dead man to pull against.

Question: On which side of the post should the wire be placed?

Neetzel: If there are livestock on one side of the fence and crops on the other, put the wire on the side of the stock. In this way they do not tend to push out the staples as they push against the fence. Also, if the fence is between a pasture and a road, put the wire on the pasture side. Some folks will say this doesn't look well; but it's the practical thing to do and that's good farming. If the snow plow comes along in the winter and jams snow up against the fence some of the staples may give but the posts won't go over. It's a lot easier to replace staples than to reset posts. If there are stock on both sides it's a good idea to alternate the wire back and forth between the posts.

Question: Do you have any suggestions on driving staples?

Kite: Always remember the line posts should have no tension on them; they merely support the wire. Thus, you should never drive the staple in tight. Using U staples, drive them in pointed downward and crosswise to the grain so as not to split the wood. Treated wood demands longer staples than the old untreated hardwood

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March . . . 23 & 24	June . . . . 22 & 23	September 14 & 15	

RANGER RESEARCH **Dept. A** **Delhi, Indiana**

posts. The staples should be at least 1½ inches long. Two-inch staples are even better. We like the ring-shanked L-shaped staples even better than the U staples.

Staple the top wire of the fence first along the line posts to get an even top line. Woven wire fences are always built with a strand or two of barb wire on top. The first strand should not be more than 3 inches above the top of the woven wire.

As long as the fence is not stapled tightly to the line posts it can expand and contract freely between the end assemblies.

Neetzel: That's of the utmost importance. A 40-rod fence will expand and contract several inches between the warmest days of summer and the coldest days of winter. If the wire is attached tightly to each line post that expansion and contraction must take place between each post rather than throughout the entire span and the fence is greatly weakened.

I have seen a well-made fence where the wire between two line posts was pulled down as much as a foot by a snowdrift. This tightened up the wire along all the rest of the fence and the next spring the low spot snapped right back into place. Had the the staples been driven tight it could not have done that.

We have found that sometimes the fences which look the loosest when they are built are the ones which last the longest. They stay in their original condition while those which were stretched very tight tend to stretch out in the contraction and expansion of the wire and they deteriorate rapidly.

Question: In putting up a barb wire fence how can you tell when you have stretched the wire tight enough?

Neetzel: You can't. That's one of the difficulties with barb wire; there is no built-in clue, like the tension curve in woven

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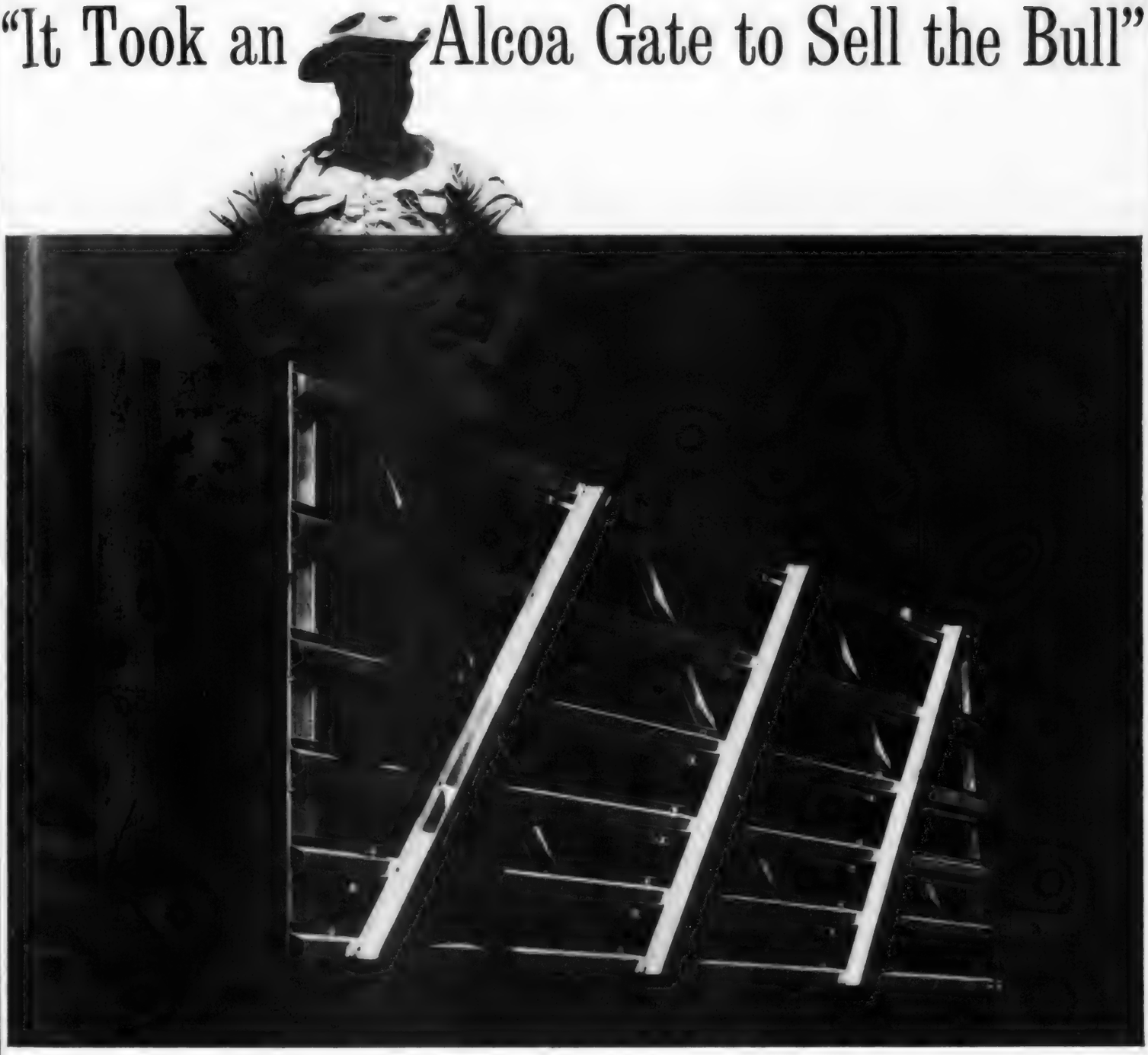

"Fellow came here to buy one of our registered Polled Hereford bulls a while back," recounts Maurice Wagner, stock farmer at Eau Clair, Pa. "One young bull in particular took his eye right away.

"I made him a fair price but he stalled, kept looking around, wouldn't come to terms. Finally he told me what was holding him up. 'You throw in one of those Alcoa Gates you're fixing to hang and I'll pay your price,' he said.

"I gave him the gate. I hope he likes it as well as we do ours. We have 30 of them on the cattle pens and across the farm. Some have been up three years now; 28 are as bright and sturdy as the day we got them. We had trouble with the other two, but it was our own fault. We hung them wrong.

"Whenever I replace a gate now, an Alcoa Gate goes in its place. They're easy to hang and we don't have to paint them.

"They're easy to open and light to handle, too. That's important to us, because my wife and the children use these gates as much as I do myself," Mr. Wagner states.

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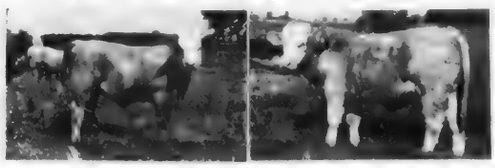

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wire, to warn you when it has been stretched tight enough. One rule of thumb in stretching barb wire is to make the top wire in a stretch of say 20 rods, just long enough so that after it is stretched it touches the ground in the middle of the span. Then pick it up at the middle and begin stapling.

Kite: I think we should also point out that between temperatures of 80 degrees and 20 degrees barb wire will expand and contract 3 inches in 40 rods. No one should fool himself into thinking he can put up a barb wire fence with less bracing than woven wire. Actually, you need stronger braces for barb wire than for woven wire. In stretching the barb wire, start with the top strand, if your braces are strong; if they are weak, start at the bottom.

And always remember, with either woven or barb wire, never stretch the fence as tight in hot weather as in cold weather.

Question: We haven't said anything yet about stretching fence on the contour. You've undoubtedly had a lot of experience with that kind of construction on the Virginia hills, Mr. Kite; could you give us a few hints on how to take the curves?

Kite: Well, of course, the prime rule in fencing on the contour is to always stretch the fence on the outside of the curve. In putting in your posts you should lean them outward a little, too.

We never stretch more than 20 rods in one span on the contour and we always locate our brace assembly so it is perfectly straight and we usually try to have the first line post in a straight line with the brace before going into the curve.

To determine the spacing between the line posts on the curve we stake a smooth curve along the contour with a stake spacing of 16 feet. Then we select three consecutive stakes where the curvature changes appreciably and draw a line be-

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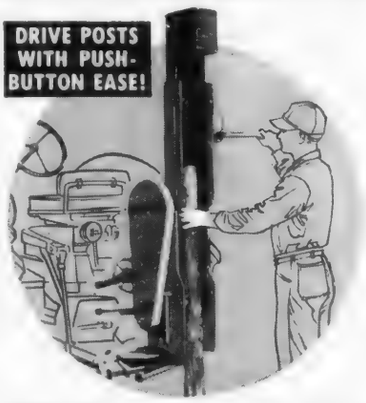

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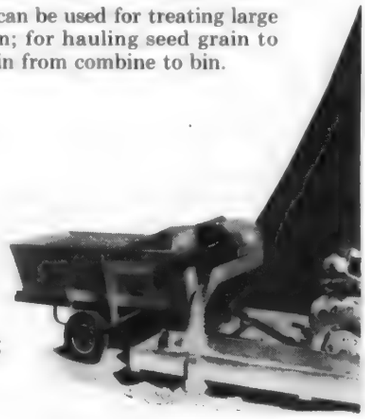

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tween the first and third stakes. We measure the distance from the center stake to the line and use this table to determine the proper spacing for the posts:

Distance of Center Stake to Line (Inches)	Recommended Post Spacing (Feet)
4 or less	16
4 - 5	15
5 - 6	14
6 - 8	12
8 - 14	10
14 - 20	8

Question: What about this zig-zag fence you people are using up there in Minnesota?

Neetzel: This is strictly a temporary fence adapted for use with hogs, sheep, calves and poultry. We don't recommend it for cattle or horses. It is economical, it goes up fast and it can be used over and over again.

You put in two end posts, one at each end of the line you are going to fence. Then lay out a length of woven wire, enough to fit loosely between these two ends. Attach a 2x6 to each end of the wire and fasten these to the end posts. Drive steel posts along the fence, off-center and at an angle; by the time you drive the last post the fence will be tight.

There is no attachment of the wire to the individual line posts. The fence is held up by the knobs on the posts and by the zig-zag pattern. The only tool needed is the post driver.

After the fence is up a stranger would probably wonder at the condition of the man who built it; but it turns stock and that's what counts. (A picture of this zig-zag fence appears on page 66.)

Question: Of all the various types of field fence you build which do you consider the most practical, Mr. Kite?

Kite: Well, the 47-inch woven wire fence with one strand of barb 2 to 3 inches above the woven wire is pretty standard. The three-strand barb wire fence comes in for a lot of use, too. But the 32-inch woven wire fence with one strand of barb 3 inches above the woven wire and another strand 10 inches above that makes a very practical fence. It is not high enough for horses but for all other stock it is quite adequate and an economical fence to build.

Postscript: For further reading we highly recommend: *Building Farm Fences* and *Planning Farm Fences* available at 50 cents apiece through the Coordinator's Office, Agricultural Engineering Department, University of Georgia, Athens, Georgia; Extension Bulletin No. 272, *Building Better Farm Fences,* University of Minnesota, St. Paul 1, Minnesota, and *Suggested Specifications for Farm Fence Construction,* prepared by the American Society of Agricultural Engineers, St. Joseph, Michigan.

REFILLING OUR WELLS (*Continued from page 74*)

take a lot of rains before the water tables had risen enough for the water to ride on the surface. Heavy pumping began back in the 1920's. Since then the water has seldom reached the Bay except during a heavy flood.

"You'll need a bit of history and geography to get the picture of our problem," Frew said. "The Salinas Valley is 150 miles long and about 30 wide—4,780 square miles. It lies between the Santa Lucia and Mt. Diablo mountain ranges and is the locale of a lot of early Spanish and California history. The first irrigation in California, and perhaps the nation, was recorded at the San Antonio and Soledad missions in the 1770's. With the coming of centrifugal pumps the first well for irrigation purposes was drilled at the outskirts of Salinas in 1898 on a small farm owned by Dr. John Faulkner, the local veterinarian.

"The coughing of the first agricultural steam-driven pumps," Frew continued, "awakened progressive farmers in the Valley to the realization of their dreams in the development of the rich soil resources of the Salinas Valley floor. First came alfalfa, then sugar beets, potatoes, other vegetables and fruits. Acreage grew from 890 in 1889 to 115,000 acres served by 2,200 wells in 1957.

"But," Frew said, "although we marveled at the transformation of the 'Salinas Desert' into a Garden of Eden, some of us were

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frightened at the tremendous volume of water being drawn out of the ground. Charles Pioda, manager of Spreckels Sugar Company, first raised the warning flag back in 1925. He said the aquifers could be overdrawn, and helped to organize a water conservation committee which recommended the building of eight dams on the tributaries of the Salinas River. These suggestions were brushed aside. There was water then, and a profit in the making."

Realization that the ground water was almost gone came in 1948 when salt water was pumped out, damaging some 5,000 acres of crops in the Watsonville-Castroville area near the Monterey Bay. Overdraft in the 250-foot deep aquifer has caused salt water to flow toward the wells inland at the rate of 12 to 24 feet per year.

"Farmers then drilled down to the 600-foot level and found another fresh-water basin," Supervisor Redding said. "How long this aquifer will last keeps the artichoke growers worried."

"Our job was clear," Frew said, "we had to refill our wells with fresh water. Our method was to control the spring run-off water and make it percolate through the stream bed into the aquifer below.

"Howard Cozzens, Monterey County Engineer, told us the safe yield of ground water from the Salinas Valley aquifer was around 200,000 acre feet. We had been using over 270,000 acre feet, overdrawing our water bank by at least 70,000 feet per year.

"In 1945," Arnold Frew continued, "Army engineers and the State of California recommended the San Lucas dam be built on the Salinas River at a cost of $15,000,000. This reservoir would take over 5,000 acres of good farm land in the San Lucas, San Ardo area. And the Army wanted to build a spillway to handle 400,000 cubic feet of water every second at flood. We figured if we had that much water coming down the valley, we'd better get the hell out of it. So the valley farmers turned down the Army engineers' offer. We then looked around and decided to test the Nacimiento dam site ten miles up this tributary from the Salinas River.

"County engineers estimated it would hold 350,000 acre feet and cost $7,000,000. Most of all, it wouldn't ruin one acre of good crop land. The first dam site selected was located on Camp Roberts property. The Army stalled in giving permission to build the dam. I got the committee together one night after getting another run-around," Frew said, "and put the question to them, 'Why wait around 20 years for the Army to make up its mind? It's time the people themselves took a fist in it.' So we chose another site off Army property one mile upstream and went to work.

"Bill Redding, who was farming just across the road from me, was elected to the County Board of Supervisors and his main goal in running for office was to help push through the legal end of this water fight. He guided a bill through the state legislature in 1945 giving Monterey County permission to create the Monterey County Flood and Water Conservation District. After the district was created the next job was to float a bond. We went up and down this valley preaching water conservation," Frew said. "Result was we got everybody talking water at home, in church, on the street corners. The vote for the $7,000,000 passed eleven to one. And," Frew proudly concluded, "then we built it for less because we built it ourselves. We're not obligated to the Federal government or controlled by any federal reclamation 160-acre limitation."

The Nacimiento reservoir holds 350,000 acre feet. The plan is to keep 10,000 acre feet for recreation and fishing purposes, 190,000 acre feet for water conservation, and 150,000 acre feet are flood control. The first water released is the 150,000 acre feet for flood control. The dam was completed in January, 1957, not a day too soon, as the heavy rainfall early that spring stored 30,000 acre feet and in spring of 1958 one of those once in every ten-year downpours filled the dam to overflowing. Now, 40 per cent of total annual flow of the Salinas River is being let down the river at a regulated rate all through the year and the stream reached the Bay all summer and fall.

"Salinas Valley farmers are jubilant. Aquifers are refilling. And," William Redding said, "we're saving thousands of dollars in pumping costs which will repay the $7,000,000."

Asked if the lowered tables forced farmers to install more powerful pumps, Redding replied, "Yes, as the water went down farmers had to add 20 to 60 feet more pipe. And as the depth increased they had to increase the horsepower of the pumps. In a well pump-

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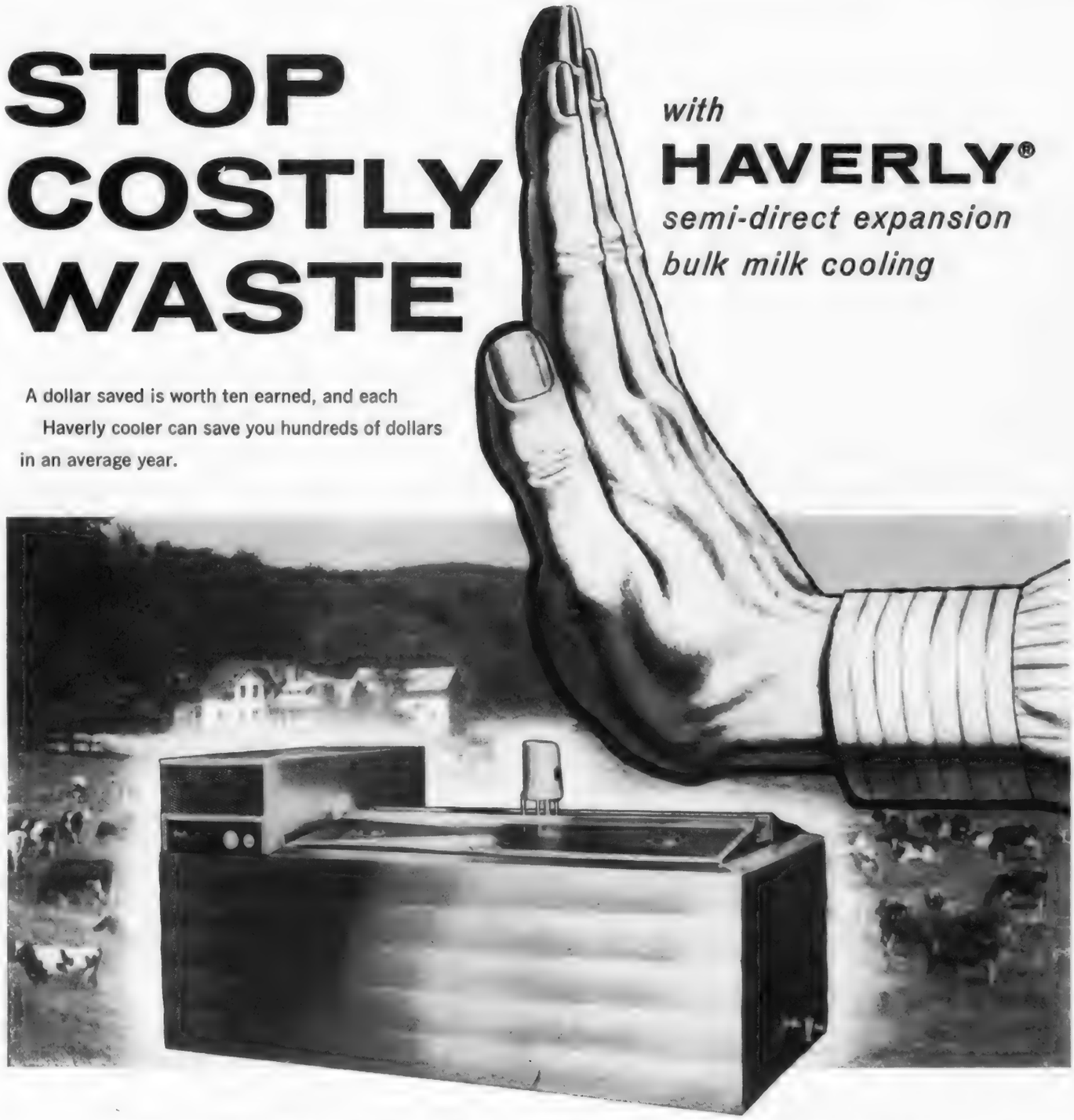

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ing 75 to 150 feet we get by with a 40 to 50 horsepower motor. When we have to go deeper we have to install 75 horsepower motors. Now we can go back to more economical motors.

"We're hoping the salt water intrusion can be stopped," Redding said, "but we've still got more water conservation to do to keep ahead of the valley's progress. Farmers are already getting braver about floods and tearing out brush and working portions of good land near the river that formerly was unsafe for farming.

"Before we built the Nacimiento Dam we'd never been able to measure accurately the percolation rate into the river beds," Redding continued, "now we've found by subtracting the stream flow into the Bay from the water released at the dam we are getting a recharge in the aquifer of at least 87,000 acre feet.

"But," Redding pointed out, "with farming still expanding we're barely keeping up. The past three years they put into cultivation another 6,000 acres of new land. This will reduce our water surplus by 24,000 acre feet as each acre irrigated takes about 4 acre feet of water per season for most of the crops raised here. We're looking to the future, however," Redding emphasized, "and have plans under way right now to put a 400,000-acre foot dam on the San Antonio River, another Salinas Valley tributary. We can only hope to fill it completely when a very wet year rolls around, but we will store all the normal spring run-off which will add some 50,000 acre feet to our water bank account during normal rainfall years. We are fortunate the high watersheds of both the Nacimiento and San Antonio Rivers around Cone Peak and Cole Springs have an annual rainfall of about 100 inches. And as the rainfall is only 13 to 14 inches in Salinas Valley, we really need to hold this rain."

When he was asked if the two-year-old Nacimiento Dam project was helping, Roger Little, a Greenfield farmer, boomed back in a big bass voice that seemed to come out of his toes, "I'm already getting a lot more water than last year and my pumping costs are less than they've been for years." And Art Swank, farm foreman for Hardin Farms, Inc., at Soledad, was questioned while taking a sample of well water to test for salt and mineral content, a practice most farmers carry out every year. "We've been damn fools for not doing this 20 years ago," he replied. "Four years ago the water table at this well was at 50 feet. Today it's back up to 30 feet. This well is pumping 1,200 gallons per minute and the drawdown was only 16 to 18 feet this past year. In 1956 it went down to 40 feet."

Spreading water over the natural recharge area as they have done at Salinas and in Santa Clara County is probably the cheapest and most effective way to get the water into the aquifer. But when the aquifer is several hundred feet below the ground surface and is covered by an impervious layer of clay, the only way to get water back into

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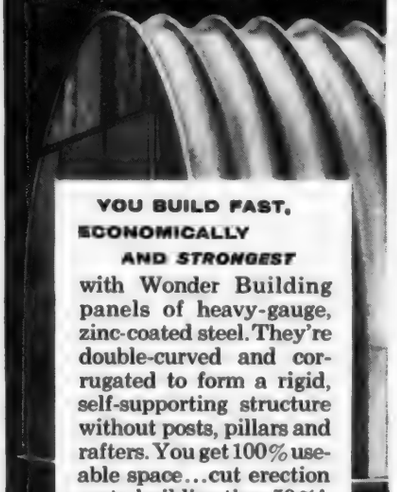

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IN FORMULA FEEDS

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the aquifer is through a well. Precautions must be taken when using this direct approach to keep from pumping silt or vegetable growth such as algae into the aquifer and blocking it. Each recharging operation will have its own problems.

As to the value of this water, Frew explained, "What's the water worth? Depends on the economy: In 1921 farmers figured water in our valley was worth $6 per acre foot. In 1957 the price tag was up to nearly $60. When you talk of the economy of 50 years from now, why heavens above, this water value may be as high as our satellites. Colorado River water in the Los Angeles area now costs $35 per acre foot just to get it pumped there."

"Multi-purpose pumps look like the answer to recharging our wells in the High Plains area of Texas," reports W. L. Broadhurst, Chief Hydrologist of the High Plains Underground Water Conservation District. "We've carried out two very successful experiments in Floyd and Lynn Counties. On the Allmon farm five miles east of Petersburg in Floyd County, in October of 1953 a well was drilled near the edge of a 40-acre lake to a depth of 377 feet. A 12-inch casing was perforated with half-inch slots from 130 feet to the bottom. A pump was installed removing 1,000 gallons of water per minute. After a 2.6-inch rain had collected 52 acre feet in the lake it was let settle for two days to clear the water. Then the pump was reversed, pumping the water down into the well. At the end of the first 24 hours the well had taken 964,000 gallons of water and was still taking 540 gallons per minute. After eight days the well had received 4,200,000 gallons of water and was taking 200 gallons per minute. This quantity, now stored in the sand beneath, is equal to 13 acre feet and sufficient to put 4 acre inches on 38 acres of land," Broadhurst said.

"The future stability of the High Plains hinges on the salvage of surface water from thousands of depressions which dot the area," Broadhurst continued. "The average annual 18-inch rainfall run-off that collects in these shallow lakes has amounted to more than a million acre feet except during the recent four-year drouth. A small percentage moves downward naturally but most of this water valued at $24,600,000 is lost through evaporation. Our goal is to save this water with multi-purpose pumps. Farmers are installing permanent recharge and production wells and pumps throughout Texas. W. E. McFarling at Lubbock has a recharge pump in operation. J. A. Howell of Idalou has drained a lake on his farm five times each year. On the J. E. Hancock and J. C. Ainsworth farms a $400 recharge installation benefited both farms in the cooperative project."

"Artificial recharge wells in the Amarillo, Texas, area have proven highly successful," reports E. A. Moulder, hydraulic engineer for the McDonald well field. "We've found we can recover about 80 per cent of the recharge water injected during the winter months."

Utah has raised the water tables in several areas with the construction of surface reservoirs. Before the Deer Creek Dam was built, Abe Giles of Center Creek, Utah, had about given up his stock-watering well. "Now," Abe says, "my well has raised over 30 feet since the Deer Creek Dam went in. This backed up the underground water in the valley and we benefited."

Utah has constructed several other larger storage reservoirs in canyons which have

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MASSEY-FERGUSON EXECUTIVES check specifications of Massey-Harris 82 self propelled combine powered by Chrysler Industrial Engine. Left to right: J. H. Shiner, Vice President, Marketing; D. S. Horne, Chief Engineer and J. W. Vingoe, Director, Planning and Procurement.

why Chrysler Industrial Engines power Massey-Harris Combines

Harvest time is critical across America. When the grain is ready it must be cut—now! Delays can be disastrous. So in spite of 16 to 18-hour work schedules in extreme dust and heat combines must keep working at full efficiency.

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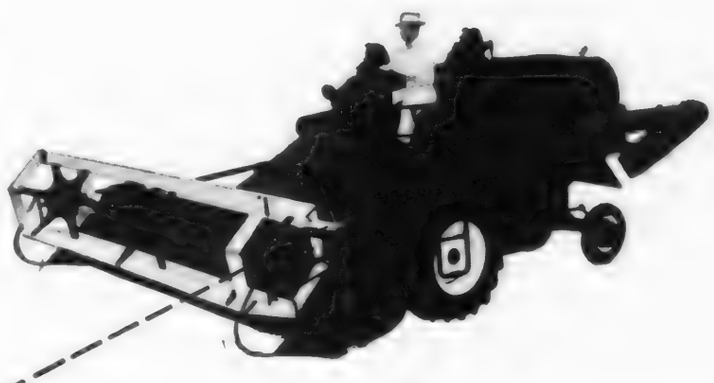
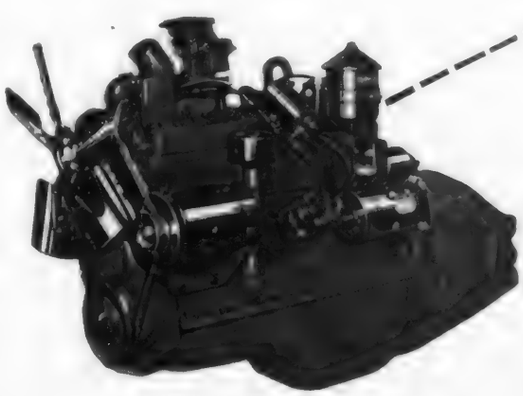


MASSEY-HARRIS MODEL 82 Combine. Hydraulically controlled cutting table is adjustable to cut from 2½ to 33 inches high. 10, 12 or 14-foot width of cut. Powered with Chrysler Industrial Engine.



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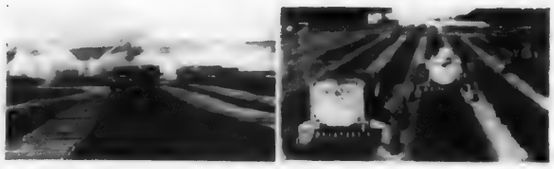

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helped raise water tables in the valleys below through even stream flow and use for irrigation. One very unusual story is at Ogden, Utah, where the famous Ogden city artesian wells were threatened with a proposed dam which would flood the wells. The problem was solved by sealing the wells, piping the water out, and continuing their use. Now with the dam built and a beautiful lake many feet deep over the wells, they flow even better and are refilled by percolation.

With engineers figuring our water requirements will at least double in the next 25 years, we are going to have to see a great increase in water-conserving practices, such as the recharging of aquifers. We know some of the answers to this problem, but more are to come. Scientists are working on the problem of speeding natural recharge by treating the soils to make them more permeable. They are also experimenting with water treatment to cause it to flow into the aquifer more quickly. They are working on better ways of filtering and sterilizing the water to prevent contamination of the aquifers. And they are mapping the underground reservoirs.

Their findings will help us refill our wells and beat the underground drouth.

THE AUTHOR: Joseph Muir is a farm advisor in Contra Costa County, California. He has studied and worked in Utah, Texas, Washington, and California—all states with water problems.

TURNING THE WORM

(*Continued from page* 87)

ger and cause more damage," said Dr. Trace. "And they can be bad in cattle, too."

Dictycide is recommended at the first sign of the clinical symptoms of lungworm. These are coughing, rapid, shallow breathing when the animal is at rest, and heavy breathing after mild exercise. Diarrhea is common in calves, and sheep may have nasal discharges. In swine the symptoms of influenza and lungworm are similar, especially in the fall.

In cattle and sheep the eggs hatch in the lung or the digestive tract, and pass in the droppings as larvae, detectable by microscope. In swine the eggs are passed in the feces, but identification is not difficult. Veterinarians emphasize that absence of larvae or eggs in the dung does not necessarily mean no lungworms.

Dictycide is not effective against immature lungworms—nor against lungworms in other parts of the body—migrating from the intestine to the lung.

The life cycle in cattle, sheep and goats is simple. The adult worms, in the lungs, lay eggs which are coughed up and swallowed. These hatch in the intestine and the larvae are expelled in the dung. The lungworms of cattle won't infect sheep. Most worms have a specific host and no other will do. The larvae grow in the feces and the infective third stage larvae develop in about a week. These, when eaten by the right host, pierce the intes-

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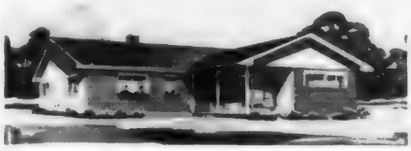

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tinal wall and follow the lymph and blood vessels to the lung. Only then are they susceptible to Dictycide.

In swine the eggs are passed in the feces, and must be eaten by an earthworm. They then hatch and infect the earthworm, and the infected earthworm is eaten by the pig. Again the larvae migrate to the lung.

"Usually," said Dr. Trace, "one shot of Dictycide will do it. But for severely infected animals we recommend a second or even a third dose. They can be given at daily or weekly intervals. One shot lowers the population of lungworms, and breaks the cycle. The natural resistance of the animal helps after the first shot so reinfection to any marked extent is unlikely."

Dictycide is available only through veterinarians, throughout the U.S. and Canada. The cost varies, since the dose is one cc. per 35 pounds body weight. The dose for a small pig might cost a quarter; for a cow, taking 20 cc. (the maximum dose) it may be a dollar or two. But where it is needed, it's worth every mill.

Intestinal Worms

If the size of the chemical field lined up against him is a factor, the intestinal worm is far worse off than the lungworm. There are as many or more potions as there are species of worm that attack in the gut. And worms of this type cause the most widespread worm damage.

The intestinal worm—especially the ascarid, or roundworm, of hogs—is easy to

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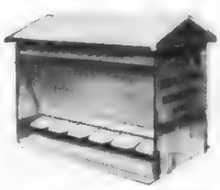

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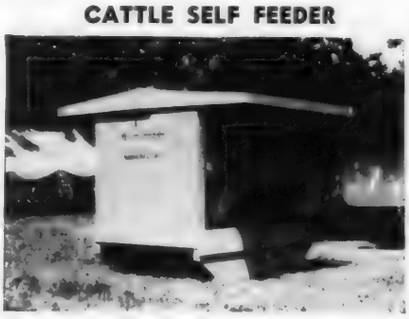

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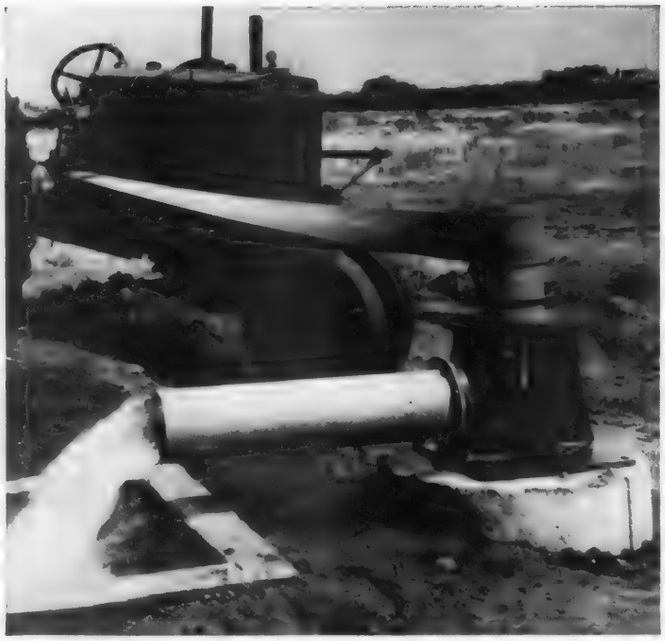

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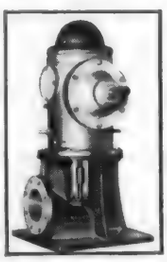

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detect. It appears in the feces, a white monster up to a foot long, pale and disgusting. An animal may have so many they completely block the lower intestine, and autopsy shows the intestine bulging like a braided rope, shaped by the adult worms it contains.

Hog worms are ever a problem. The habits of a hog are the worm's delight. The hog is, in confinement, not a fastidious eater, with dung and food often too close together.

The ascarid or roundworm is the most common worm in hogs. It is also the biggest but the smaller whipworm, in numbers, can be just as damaging.

Drugs have improved, they now control more species of worms. The three most important intestinal worms of swine in most areas are the roundworm, the nodular worm, and the whipworm. These last two are smaller worms, but heavy infections can be just as fatal as ascarids.

Salt, sand, and skim milk have at various times been credited with the ability to deworm swine. Now chemicals bring more than just discomfort to the parasites.

Sodium fluoride is a common wormer, but also a dangerous poison. In extremely small amounts it builds healthy teeth, slightly more of it will kill internal parasites, and not too much more kills pigs. One pound of fluoride is mixed with 99 pounds of dry feed. This is offered to the animals for 24 hours only. Fluoride tastes bad to the pigs, so feed intake is depressed. However, the fluoride can kill most of the roundworms—97 per cent in a USDA test. If directions are followed there is no difficulty and sodium fluoride kills young and old roundworms. It is probably the cheapest wormer at about a nickel a pig.

Cadmium compounds—either the oxide or the anthranilate—have worm-killing properties. Both cause vomiting in overdoses. The oxide is fed at fifteen parts in ten thousand of feed, the anthranilate 44 parts in ten thousand, both for three consecutive days. The feed is palatable, and at the rates given, there is no ill effect on the pigs. The oxide killed 98 per cent of the roundworms in one USDA test. The anthranilate is just as effective, but the worms are voided from the third to the tenth day after worming. The cost is about a quarter, but the pigs must be held for 30 days before slaughter, as the cadmium accumulates in the liver and kidneys and is only slowly excreted. Sole U. S. distributor for the anthranilate is Hess and Clark at Ashland, Ohio.

The piperazine compounds were introduced as worm killers quite recently—within the last four years in any quantity. They have a large margin of safety—being practically non-poisonous for swine. They are put into feed or drinking water, in doses based on the average weight of the pigs. The minimum dose is 50 milligrams of piperazine *base* per pound of pig. Parvex is another piperazine compound, comparable in effect to sodium fluoride, but far safer. Most of the piperazine compounds cost around 10 cents for a 100-pound pig. Several companies offer them under slightly different names. The piperazines are also useful for roundworms in other animals.

With the poisonous wormers, worming was a one-shot operation, and the hog lot was slippery with worms within 24 hours. Not so with hygromycin^B, latest of the hog wormers.

This antibiotic, developed by Eli Lilly and Co., Indianapolis, is fed to hogs for a long period, and controls worms on a long-term basis. Hygromycin^B has a wide safety margin—it takes a very concentrated mixture to produce even the slightest irritation—and is highly effective at the recommended dosage. Market hogs should be kept on hygromycin^B from 15 to 20 pounds weight, when they begin starter rations, until they reach 100 pounds. Hygromycin^B is sold as Hygromix, a pre-mix which is mixed with feed at the required level.

Dr. Charles Chappel, of Eli Lilly, explained, "Hygromix can be fed all the way until a pig goes to market. But when a pig gets to 100 pounds and he's clean, then the economics of any drug is questionable though there may be cases in extremely infected areas where it would pay to go to market weight."

The Hygromix is fed to sows for the last eight weeks of gestation. "It may not have much effect on the sows," said Dr. Chappel, "but some of these worms may carry virus diseases. It is known they carry hog cholera. We feed it to the sows so they

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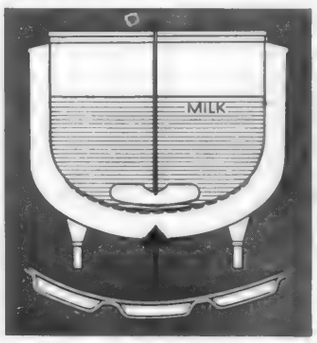
What you should look for in a Bulk Milk Cooler

- **Fast, Efficient Cooling**
- **Low Operating Costs**
- **Trouble-Free Operation**
- **Positive Refrigerant Control**

Generally speaking, the most efficient bulk coolers are those that employ the most direct methods of cooling. In the past, direct expansion coolers have usually been favored over ice bank types, due to the fact that the cooling action was transferred directly from the copper coils to the bottom of the tank liner and then to the milk. Because there was no water to cool and pump, the milk was cooled faster and operating costs were lower.



Flat, narrow, refrigerant passageways are built right into the tank liner. Freon is forced through these passageways . . . the cooling surface is in direct contact with the milk.

Sunset's *Positive Refrigerant Control* carries the principle of direct cooling even further. The passageways through which the refrigerant flows are actually a part of the tank liner itself. The cooling surface is in direct contact with the milk.

Positive Refrigerant Control gives you several important advantages. Because you are cooling just the milk, and not surrounding air or water, your operating costs are at a minimum. Because your tank operates less hours a day, it will have a longer life and you will have less service calls. Your Sunset cooler will operate only 3 to 5 hours a day compared with 12 to 20 hours a day for ice bank type coolers.

Because the cooling surface is in direct contact with the milk, your milk will be cooled faster. Also, all sections of the refrigerating compartment are cooled equally . . . temperature levels are constant throughout the tank.

Sunset Cooler with *Positive Refrigerant Control* Compressor operates only 3 to 5 hours a day compared with 12 to 20 hours for ice bank coolers.

Sunset Coolers, with *Positive Refrigerant Control*, represent the ultimate in simplicity of design. There's no water filled inner liner . . . no chance for corrosion to get started from the inside. There is no pump working constantly, susceptible to costly and time consuming breakdowns. Because there is no water chamber, there is never a problem of keeping the water clean or the circulation pipes unplugged.

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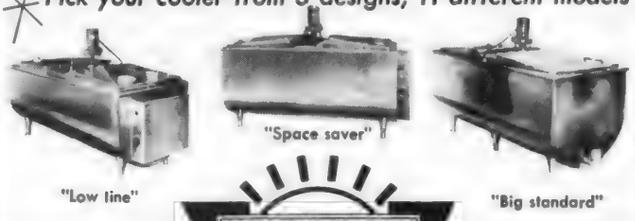
These kits contain floor planning sheets and cut-outs for milk house equipment. They're invaluable when planning your layout. Ask your Sunset Dealer or write to the address below. Also ask for 16 page Sunset Bulk Milk Cooling Profit Book.

Write to the address below or see your local Sunset Dealer for more information on the latest development in bulk milk tanks, Sunset's *Positive Refrigerant Control*.

Pick your cooler from 3 designs; 11 different models



SUNSET MILK COOLER®

SUNSET EQUIPMENT CO.

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won't be spreading worm eggs to the baby pigs." For feeder pigs, Dr. Chappel said Hygromix for eight weeks is the answer.

But if hogs are not feeding, or if they look extremely wormy, it may be necessary to use one of the purge-type wormers—to get the worms out—and then go on with the Hygromix for eight weeks. There is no trouble or interaction between the two types of wormers, given separately or together.

"There aren't many 'don'ts' with Hygromix," Dr. Chappel said. "Hygromix is used in dry feeds only, as it would be hard to control the dose in liquids. It should be fed only in the complete ration. When it is fed in a protein supplement with grain free choice in a separate hopper the dose cannot be controlled."

Hygromycin[B] controls ascarids, nodular and whipworms in swine. It is no use with cattle or sheep, though recent trials show it controls some poultry worms. Unlike the other wormers, it will prevent egg-laying by the worms. It has no taste, and does not affect feed consumption. The egg-laying mechanism of the parasite is hit first, and following that the worms begin to be eliminated from the body. It is not a fast action, and few, if any, dead worms will be seen in the feces, but the action has been over 90 per cent in tests. Hygromix costs between $2 to $3 for a ton of feed, or about 30 cents for 60 days per pig.

Some reports on the effectiveness of wormers in swine have commented on economics. The product was efficient, and the worms were eliminated, but the wormed group did not gain faster than the wormy control group, nor did they go to market earlier. This is not always the case by any means, but it does show the tolerance for a few worms a pig (or any other animal) has. Not all cattle and hogs need worming. Sheep are rarely beyond the need for systematic worming.

Constant vigilance against these silent robbers is wise husbandry. Most livestock men who keep a close daily watch over their herds check the need for worming. But a laboratory examination of a fresh specimen of dung is the only sure way of determining the type and degree of worm infestation.

A light to moderate infestation of worms does not necessarily impair health or lengthen the feeding period of well-fed animals. This accounts for some of the apparently inconsistent reports in experiments aimed to determine the efficiency and economic value of worming agents. But even a moderate worm infestation can be a factor during periods of stress.

Worms in cattle and sheep are as common as in pigs. Perhaps the signs are not as common, but worms are a factor in their health; too often they are among the last things to suspect as a cause for a sickly ruminant.

Copper sulphate and nicotine have uses as sheep wormers, but they are both poisons, with low tolerance levels. The piperazine compounds can be used in cattle as well as pigs, but none of the three are as good as phenothiazine.

Phenothiazine can be given as a drench, in a bolus, as capsules or mixed with the feed, dry or wet. Two doses are given, three weeks apart, as phenothiazine will not kill immature worms, and the second dose gets the worms that develop after the first dose. The dosage for sheep is more or less standard at 12½ grams for lambs; 25 grams for heavier or mature sheep. Dosage for cattle ranges from 20 grams to 80 grams depending on age and body weight. Substantial overdoses of phenothiazine to cattle and sheep are not generally harmful, but repeated standard doses at 15-day intervals will do a better job in heavy infestation than a dramatic one-shot overdose.

Lead arsenate is the remedy for tapeworms in cattle and sheep. It does a good job, but again is a poisonous chemical, and care is needed. A small amount, half a gram to a gram, varies with the size of the cattle. This is best done by a veterinarian.

No wormer works 100 per cent on every animal treated. One remaining female worm means eggs—in some cases millions of eggs a day—and that means future infections. In some cases, any worm is enough; as one worm contains both sexes, it lays fertile eggs without outside help. The newer chemicals make life easier—but they only enable the farmer to forget the worm for a while. He has a habit of returning.

MONSANTO'S "RED" EMM SAYS:

"Only the best weed killers come in this easy-to-use spout-top can"

Now you can get all of Monsanto's powerful 2,4-D weed killers in this **easy-flow** container. And with this brand, you get the best, chemically, you can buy. It's **full strength**, mixes easy, sprays clean and won't clog nozzles. Don't take chances with weeds this year; clean up your fields early with Monsanto 2,4-D . . . only a few pennies' worth goes a long way. Buy the best 2,4-D; you'll get it in Monsanto's easy-to-handle pour-spout can.

See the dealer who displays this sign. He'll have the Monsanto spray safest for your crop, best for your weed and brush problems.

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Send today for **FREE** copy of "Red Emm's Weed and Brush Killing Guide." Tells how you can get cleaner fields with Monsanto Farm Chemicals: Randox®... Vegadex®... 2,4-D and MCP weed killers... brush killers.

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THE BILL CAMP STORY

(*Continued from page* 54)

The present Mrs. Camp was a widow and a sizeable landowner at Trenton, South Carolina. Her husband died when her three children were quite young, but she learned the art of growing cotton and knew how to drive a tractor and repair a combine. She and Bill make an ideal and happy pair. They handle her farms in South Carolina through resident managers and frequent telephone calls and visits.

Bill has been called "Scientist turned Farmer", for it was in the scientific development of cotton that he first achieved a reputation. He was selected specifically for his scientific knowledge of cotton to search out the possibilities in California, and he was for ten years the head of the Shafter Research Station. He has extended his know-how to potatoes, and led the campaign against eradication of potato diseases on the Coast. He has his own research scientists now, but he knows what they are doing.

You can't know Bill very long without discovering that a hatred of Communism, or anything even tinged with pink, is the ruling passion of his life. Some of his friends say, "He sees a Red behind every bush." When he was in Washington with the old Triple-A he was assigned two young attorneys as assistants; the two were Alger Hiss and Lee Pressman. He felt America was being sabotaged by men like these, and he has carried his distrust to this day. "You can't be just a little Red anymore than you can be just a little pregnant," he says. He once said to me, "There are only two sorts of people in this country, good Americans and Reds."

How deeply he detests and distrusts Communists was illustrated when he gave an organ to the auditorium in Bakersfield —provided a Communist was never to be permitted to play the instrument.

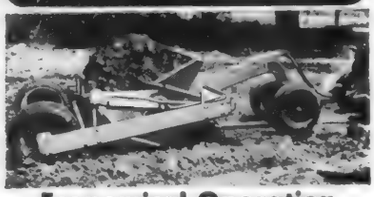
I agree with many of his friends that Bill Camp is too good to be true, a wealthy and successful man apparently without enemies. He can drive a stiff bargain and take care of himself in a trade, but I have yet to hear of a single shady deal, or any doubt about his honesty and integrity. He likes people, keeps his friends, and his home is always full of guests. The people who work for him say that he pays good wages, makes no unusual demands on them, and is quick to help them with their personal problems.

I sat with Bill in his office for an hour recently and watched these things happen. A farmer phoned from Maine to talk of a successor to Bill on the directorate of the United States Chamber of Commerce, and to discuss plans for their joint potato operation in Maine for 1959. The leading peach breeder in the West called in person to get Bill's ideas about partnership farming. A man phoned from Phoenix wanting advice about potato breeding. And finally he had a talk with a man who called from Fresno to get his opinion of which of the 1959 cotton plans were better, the A or the B option. Thus go the busy hours of this many-sided man, who always finds time to be attentive and courteous to those who come to him for help or advice.

THE AUTHOR: Jim Eleazer is a frequent contributor to *The Farm Quarterly*. He is Information Specialist at Clemson College, S. C., and author of "A Dutch Fork Farm Boy."

Fast, Low Cost EARTH MOVING

WITH THE Eversman Hydraulic Control SCRAPER



Economical Operation Precision Performance

Using your own tractor and the 2½ yard Eversman Scraper, you can do most earth moving jobs on your farm by yourself. Level land for efficient irrigation. Grade fields to improve drainage. Fill gullies and low spots. Build farm roads. Make terraces, grass waterways, reservoirs, ponds, dams, pit silos. Ideal for all dirt hauling jobs.

The Eversman Scraper is Easy to Operate

Responds instantly to single valve hydraulic control. Loads with low power requirements but with large scraper stability. Hauls at high speed. Front dump permits accurate control of fill. Strong, rugged construction. Years of trouble-free service.

Eversman AUTOMATIC LAND LEVELER

Land Smoothing Greatly Increases Yields Per Acre

Eversman leveled fields mean more profits for farmers through greatly increased production per acre. With your own tractor and at low cost you can:

1 Prepare an ideal seed bed free of back furrows and dead furrows—eliminate low wet spots that drown out crops.

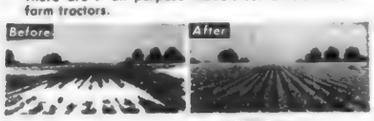
2 Prepare a base for mechanized farming. Planters will work more efficiently, cultivating can be more accurately controlled and at harvest time you can pick up all the crop.

3 On irrigated land you can save expensive water and irrigation time—insure greater yields since each plant will get its correct share of water.

4 Surface water will drain quickly from smooth fields before it damages crops.

5 Use the Eversman on rolling fields to fill small washes and depressions so that erosion is controlled. Keep your topsoil on the fields with an Eversman smoother.

There are 7 all purpose models for all standard farm tractors.



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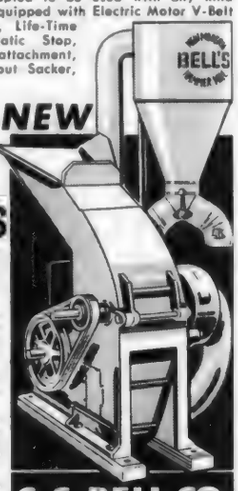

TWO SIZES TO CHOOSE FROM — The No. 10 Medium Capacity, with 2 H.P. Elec. Motor, or the No. 20 BIG Capacity Mill, using a 5 H.P. elec. Motor, or 7 to 10 H.P. engine.

- Ball-Bearing Shaft and Rotor Bearings. HARDENED Steel Hammers and Hammer-pins, easily interchangeable and reversible. Steel rotor plates.
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- Over a million Grinding Mills have been made by this Company, in business over 100 years. See your Dealer or write us direct for complete information.

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The *only* low-cost cattle oiler that is *fully automatic*. Remember, if an oiler isn't automatic, it isn't worth installing. Farnam Rope-Wick Oilers are not just "backrubbers", they are completely automatic oilers, the result of more than 10 years' experience building oilers. Cattle use them better. Get better coverage of insecticides. Can't tear them up, and won't wear them out for years to come. Easy to install. Attach to *any* post, *anywhere*.

Better Results! HERE'S WHY!

Giant 3" Marine Rope rubbing element provides perfect rubbing and scratching surface. Oils cattle thoroughly, all over! **5-Gal. Oil Supply** lasts for weeks. Keeps rope saturated at all times. **Automatic Valve** releases oil every time animal uses the oiler. Entire unit is **Spring Protected** from damage and excessive wear.

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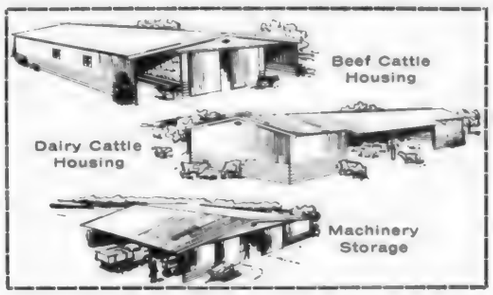

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"EVERY LITTER A PIGGY BANK FOR PROFITS" WITH NEW RED ROSE SCIENTIFIC PROVEN FEEDING PROGRAM

You'll save time . . . send your pigs to market in 20 days less time! You'll save money . . . Red Rose "Thrifty Pig" Program gets them to market on 65 lbs. less feed per pig! At the right is a summary of 1957 and 1958 Production at the Red Rose Research Center. Litters raised since preparation of this summary have shown even greater feed efficiency and growth at equivalent ages.

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50 lbs. of new Red Rose Pig Grower Pellets with every 500 lbs. of Red Rose Pig Starter Pellets. Look for the coupon in every bag of Red Rose Pig Starter Pellets.

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ESTABLISHED 1842
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65 lbs. Less Feed Per Pig!

RED ROSE "THRIFTY PIG" PROGRAM

Here's the big farming news of the year! From the Swine Department of the Red Rose Research Center comes another advancement in profitable pork production. It's the Red Rose "Thrifty Pig" Program that provides a new way to raise pigs at lower cost, less feed and fewer days to market weight.

Red Rose Pig Starter Pellets, Red Rose Pig Grower Pellets and Red Rose Porkmaker—or Red Rose Supplements with grain—are high efficiency feeds containing all the necessary vitamins, antibiotics, zinc and other trace minerals for top growth.

Combine Red Rose Feeds with good stock, good management and iron injection of little pigs at birth and you, too, will agree that there is more money in swine raised the Red Rose "Thrifty Pig" way.

Results with RED ROSE "Thrifty Pig" Program at Red Rose Research Center

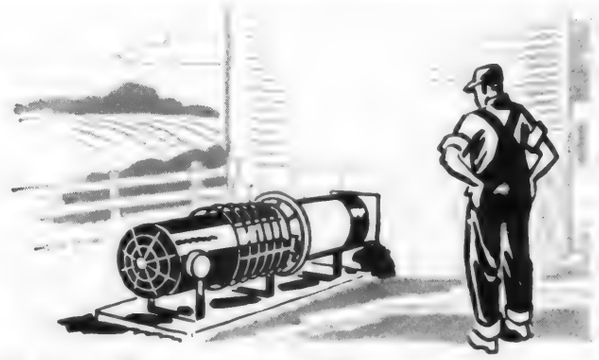
Pigs Marketed	No. Litters	No. Pigs Farrowed	Av. Wgt. Birth	Av. Wgt. 28 days	Av. Wgt. 56 days	Av. Wgt. 112 days	Days to reach 200 lb. av.	Feed Consumed	Av. Daily Gain From Birth
1957	9	110	2.6 lbs.	14.8 lbs.	40 lbs.	111 lbs.	165 days	585 lbs.	1.10 lbs.
1958	10	116	2.9 lbs.	15.8 lbs.	47 lbs.	131 lbs.	145 days	520 lbs.	1.34 lbs.

INCLUDES ALL FEED EXCEPT SOW'S MILK

Ask your Feed Dealer for a copy of "Thrifty Pig" Feeding Guide Chart

IRON INJECTION insures proper amount of iron to help prevent pig anemia and promote growth.

RED ROSE TC FEED to improve vigor and appetite after vaccination, for before and after farrowing or during times of stress.



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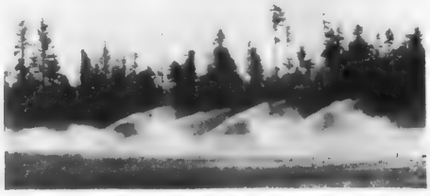

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CAMPBELL-HAUSFELD

HOW TO LICK THE FORAGE PROBLEM

(*Continued from page* 90)

from a top of 60 per cent, which is achieved in perhaps 1 time out of 7, to a 65 per cent recovery in 6 times out of 7. The rate of recovery is the per cent of the nutrients in the standing crop that are saved in the preservation.

Be sure the crimper you buy rejects stones. Some merely stall. Since hay conditioners drop the material a little higher on the stubble than they picked it up, they help to prevent more stones from damaging baling equipment. Be certain the crimper or crusher picks up the mowed crop well. The ideal set-up would be to have a power take-off arranged so a mower and crusher could be operated at once, the mower at the side and the crusher behind, picking up the swath cut on the preceding round.

Heated air drying is too costly for many farms, unless the hay is to be sold, in which case artificial drying is always advisable. Artificial drying with unheated air is most effective when haymaking weather is good. When haymaking weather is bad, such drying may be a total and dismal failure. A day in late May might be ideal for haying until 3 o'clock. Then the humidity rises. The hay is at 35 per cent moisture in the windrow when a dark bank of clouds appears in the west. That hay is ready to bale if you can get the excess water out with a fan. The hay you might have lost today will be drying tomorrow and the next day if the weather is favorable. But if the humidity keeps rising, followed by days of rainy weather, the hay you put in just before the rain will never be anything but poor hay no matter how long you run a fan pushing unheated air. Heated air would dry the crop while retaining the quality, but it would have to be first-quality forage like young, leafy alfalfa to begin with or the expense of heating the air would not be justified.

Chopped hay has its limitations. It is hard to dry, a nuisance to handle, difficult to store and if artificially dried requires a great deal of skill in placing it over the driers. When it is field chopped, the hay segregates, stems separate from the finer parts and the best part of the hay never gets into the wagon at all; it is too light and fluffy and goes off as dust. It makes good but expensive field fertilizer. Chopped hay has its place where large quantities are to be used, and where the cost of specialized driers and wagons are not prohibitive. Such chopped hay works well when fed in mixtures with silage. However, baled hay can be chopped into silage just prior to feeding in the same manner, primarily to improve palatability.

Store hay carefully so that you always have access to any kind of hay. Don't be forced into using up all your good hay to get at the poor hay. In building new hay structures, side access should be provided so the hay can be piled in columns, with

How YOU- can benefit from-

This year of 1959 is the Golden Anniversary of Wisconsin Engines. It heralds 50 years of continuous engine progress. Fifty years of engineering development and exclusive specialization in the design and manufacture of engines.

- From the very first, over a span of 50 years, Wisconsin Engines have been leaders in the internal combustion engine field from the standpoints of *quality* and *performance* . . . with direct benefit to *you* as a power user.
- Originally manufactured in a power range up to 200 hp., Wisconsin Engines helped to make automotive history as well as supplying dependable power for many industrial applications — service that called for the most advanced engineering.
- Heavy-duty design and construction and High Torque performance have been traditional features of *all* Wisconsin Engines. You get longer life from Wisconsin Engines and lowest cost maintenance.
- Today the Wisconsin line comprises the most complete line of Heavy-Duty Air-Cooled Engines in the industry. They are supplied in 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models in a complete power range from 3 to 56 hp. There is a Wisconsin Engine of the right size and type to fit the job and the machine.
- Every Wisconsin Air-Cooled Engine is designed for heavy-duty service under all climatic conditions from low sub-zero to 140° F. You get the *Most Engine* for your money for MOST HP. HOURS of service.
- For 1959 Wisconsin has available a complete line of factory-built LPG Engines (including conversion kits for field installation on Wisconsin gasoline engines). In addition, we offer a new line of heavy-duty, quality-built Vertical Shaft Engines, from 3 to 7 hp.
- More than 2000 convenient Wisconsin Authorized Service Stations stand ready to provide expert servicing and factory-built parts for all Wisconsin Engines.

Constructive experience is a priceless asset. The benefits to the manufacturer, distributor and user of power equipment are many. You are best served in all respects when you specify "WISCONSIN ENGINES"... *for better service, low-cost maintenance, trouble-free operation and long engine life.* Write for engine bulletin S-237.

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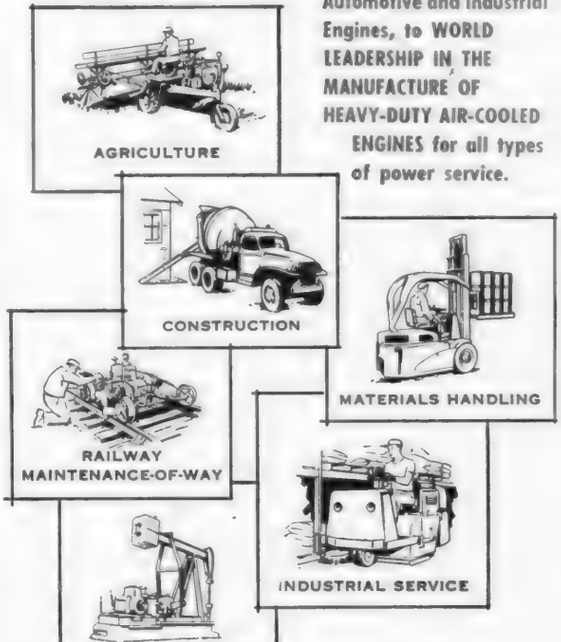
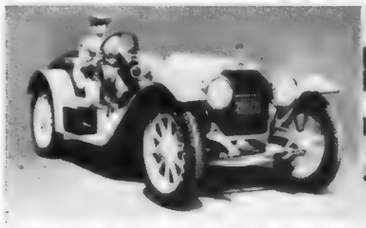
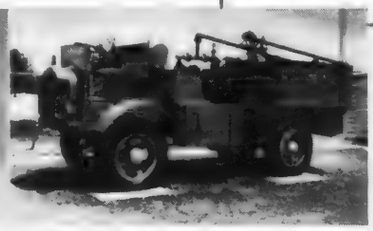
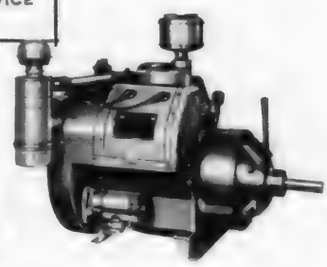




This 1914 Stutz Bearcat, one of the most famous and rugged cars of its day, was powered by a Wisconsin Heavy-Duty Water-Cooled Engine . . . a power leader of high recognition even at that early date.



This FWD Wisconsin-powered truck, known as "No. 28," was purchased in 1921 from Army Surplus, and after many years of service is now on display at the Halliburton Oil Cementing Co., in Oklahoma.



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Now, you can accurately test your soil before putting your EZEE FLOW spreader to work for faster, easier, accurate and more profitable fertilizing.

Your EZEE FLOW Will Put the

- ✓ **RIGHT FERTILIZER in the**
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REMOVABLE AGITATOR
New feature makes hopper cleaning even easier . . . with Easy-to-Lift-Out Cam Agitator.

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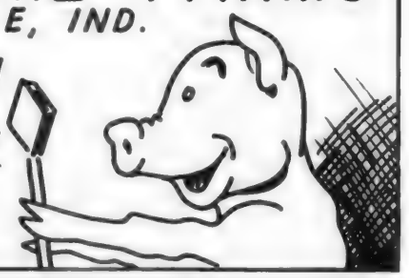
TESTING! TESTING!!
10 YRS. CONTINUOUS TESTING
HOME OF
BOARS FROM
Production Tested Litters



GROEN *Guardsman*

BULK MILK COOLER

Mr. Dairyman:

You get a "built-in" bonus value when you buy a Groen. You get the benefit of over 50 years' experience making the finest stainless steel equipment for the food and dairy industries.

Dairymen of good judgment, who think for themselves, recognize the extra dollar value of Groen Guardsman Coolers. They know it's a quality tank, engineered to last longer, serve you better, cost less over the years. For a better tank for your money, or a bigger tank for every-other-day pickup — move up to Groen . . . the tank with the "built-in" future!

GROEN GUARDSMAN TROUGH TYPE: 320 to 600 gal.

The ORIGINAL
Round "Spacesaver"
100 to 340 GALLONS

★ Lifetime Stainless Steel ★ Low Cost Direct Expansion Cooling
★ Easier Pouring Because It's Lower ★ Easier to Clean

GROEN MFG. CO., Dept. C-510, 4539 W. Armitage Ave., Chicago 39, Ill.
I want to see for myself why Groen is the better buy. Please send your "Cost-saving" Kit.

NAME.....

ADDRESS.....

HERD SIZE.....

no necessity for disturbing one kind of hay to get at another.

The new plastic hay covers, which are increasing in popularity, have a big disadvantage. They are so impervious to moisture that hay in the upper layers spoils from condensed moisture that cannot escape.

Drag Strip Farming

Perhaps I am something of a heretic, but I believe farmers too often use machinery needlessly and inefficiently. Considering the amount of time spent in driving tractors, the horsepower used and the little work accomplished, a lot of tractor driving can only be justified on the basis of the fun it gives the farmer. A high-powered car can be driven cheaper than a tractor.

Harvesting silage by direct cut is usually a good way to tour your farm. Say you have 1200 acres to cut, or 400 acres to cut 3 times. You use a 4½-foot sickle bar on your chopper. You would travel 2509 miles with harvester, tractor and wagon in cutting the crop, and you would travel another 4000 miles in hauling the crop.

If you cut the 1200 acres with a 7-foot mower, rake it into windrows with a 10-foot rake, then drive down the big windrows at a slow 1½ to 2 miles an hour so the chopper can handle the windrow, you will spend the tractor time and power in chopping the crop instead of dragging a train down the field. It will take only 40 per cent of the chopping time to chop from the windrow. Man-machine hours would be reduced by 20 per cent. Wagon travel in cutting the crop would be cut in half. Wagon travel from field to silo would also be reduced.

In 1200 acres by direct cut there would be about 400 loads. It costs 25 to 30 cents just to haul a load, so you'd better cut the crop and let it wilt in the field to get the water out of it. That way you can haul more per load and reduce travel time further. The wilted material will also reduce power and time requirements at the blower. The cost and the moisture content of the crop are closely related.

Though it means more trips over the field, I heartily endorse the use of a crusher or crimper in silage making. Splitting the forage stems promotes the growth of desirable organisms in the silage. Most silage men now believe that the juices and the bacteria need to get together for the bacteria to grow properly. Crushing aids the process. Quality is improved while time is saved, for crimping can cut wilting time from 5 or 6 down to 1 or 2 hours. Reducing exposure to the weather is certainly an advantage. The longer a crop lays in the field the more chance there is for it to use up its own substance through respiration.

Preservatives

Preservatives are used in place of wilting. The two are never used together. Preservatives are preferred when the forage is predominately grass or when it is very wet and cold. Many mornings during May and June, the temperature gets down

WYETH
ANIMAL HEALTH TOPICS

How Much Does Mastitis Cost You?

Are you losing cows and milk because of this disease? Wyeth has three products which provide fast, effective treatment of mastitis. One of these three will fit your mastitis-treatment needs.

OINTMENT TRIBIOTIC® is a broad-spectrum antibiotic combination developed by Wyeth to treat and prevent mastitis in cows. Penicillin, dihydrostreptomycin, and bacitracin have been combined in Ointment TRIBIOTIC to give you a 3-way attack against mastitis-causing organisms. By combining the three, you get broader antibacterial action. Another advantage is the exclusive base of Ointment TRIBIOTIC which promotes complete udder tissue spread.

For the farmers who prefer a bougie form of mastitis treatment, Wyeth has **PENSTIX®** and **PENSTIX®-SM.** PENSTIX bougies contain crystalline procaine penicillin G to attack mastitis-causing organisms responsive to penicillin alone. PENSTIX-SM bougies combine crystalline procaine penicillin G and dihydrostreptomycin sulfate to fight the organisms that are not responsive to penicillin alone. Both PENSTIX and PENSTIX-SM have an especially compounded milk-soluble, non-irritating base, and are designed for painless insertion. They don't spoil and no refrigeration is required.

AVAILABLE: All three mastitis remedies are available from your animal health product supplier. Ointment TRIBIOTIC is supplied in 3.75 Gm. handy squeeze tubes for easy application. PENSTIX bougies are supplied in vials of 6 and bottles of 12. PENSTIX-SM bougies are supplied in bottles of 12 and 25.

Treat Serious Infections The Modern Way
INJECTION BICILLIN® FORTIFIED

Benzathine penicillin G and Procaine penicillin G, Wyeth

Busy farmers use INJECTION BICILLIN FORTIFIED because it enables them to treat serious infections *without wasting time and money.* It is the modern way to treat pneumonia, foot rot, navel ill, and other costly infections.

INJECTION BICILLIN FORTIFIED provides high immediate penicillin blood levels which promote more rapid spread of penicillin through the tissues to fight serious infections *fast.* It maintains penicillin in the system for an extended period of time, reducing secondary infection and helping recovery of the animal. Farmers appreciate the fact that *one injection* provides both high, immediate levels and prolonged levels.

INJECTION BICILLIN FORTIFIED is available from your usual supplier of animal health products as a stabilized aqueous suspension of penicillin in 10-cc. and 50-cc. vials (300,000 units per cc.); in 1-cc. TUBEX® sterile-needle units (600,000 units per cc.); and in 4-cc. disposable syringes (2,400,000 units per syringe).

Cut Shipping-Weight LOSSES By Over 50%

Injection
SPARINE®
HYDROCHLORIDE
Promazine Hydrochloride, Wyeth

Cattle shipped from range to feed lot lose weight due to the rigors of shipping. You lose money. Injection SPARINE given intramuscularly to cattle before shipping, *cuts weight losses by over 50 per cent in most cases.*

SPARINE cuts weight losses by controlling the tension, nervousness, and unruliness of animals during handling, loading and shipping. Animals remain steady on their feet without grogginess even in transit. Animals go on full feed fast upon arrival because there is no bawling, fence walking, or milling.

SPARINE has other uses on the farm. It facilitates branding, dehorning, circumcision of bulls, and castration because SPARINE-treated animals are easier to handle.

Talk to your veterinarian about SPARINE. He will show you how SPARINE can make your job easier.

SPARINE is available only through veterinarians.

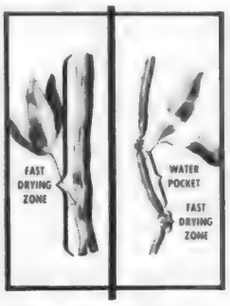
To Keep Animals Healthy *Economically*
RELY ON *WYETH* ANIMAL HEALTH PRODUCTS

Brillion
BUILDS THE BEST
HAY CONDITIONER

Get every one of these features on your hay conditioner—

Only Brillion has them all

- Fastest drying, by college test. Because stems are opened for evaporation their full length, instead of only in spots.
- Saves leaves. No tearing, clipping, lacerating. Brillion-conditioned hay carries its leaves to the barn.
- All four drums power driven. Non-powered reels on ordinary hay conditioners rip tender leaves, tear and clip heads.
- Special guide roller. Power-feeds hay directly into crushing rollers.
- Fluffer. Leaves conditioned hay standing tall in the swath. Cuts drying time.
- Sealed-for-life bearings. Only 3 places to grease on the whole machine!
- Big 15-inch tires. Ride easily, smoothly over rough fields. Timken roller bearings.
- Heavy-duty roller chain drive. No belts to stretch or slip.
- Choose your own drum style. Smooth or slotted, to match your own crop conditions.
- Bigger drums. Large diameter drums open stems gently, without clipping off tender tip and leaves.
- Side-mounted wheels. Run clear of conditioned hay. Prevent digging into high spots.
- Light draft. Any one-plow tractor with standard PTO can pull the well-engineered Brillion.
- One-man hookup. The Brillion is balanced, light on the drawbar.
- Brillion-built for long life. Crafted by Brillion's own skilled engineers, foundrymen, machinists.



Why Brillion-conditioned hay, left, dries faster, carries its leaves to the barn. Stem is opened for evaporation along entire length. Leaves are firmly attached, undisturbed.

Contrast with crimped hay, right, which is only pinched intermittently, leaving water pockets between each pinch. Too, crimper's tearing action strips off leaves, chops many stems —causes field losses by dropping high-protein cow feed down into stubble.

IF BRILLION MAKES IT . . . IT MUST BE GOOD!

CLIP and MAIL ☐ Write your name and address on the margin.

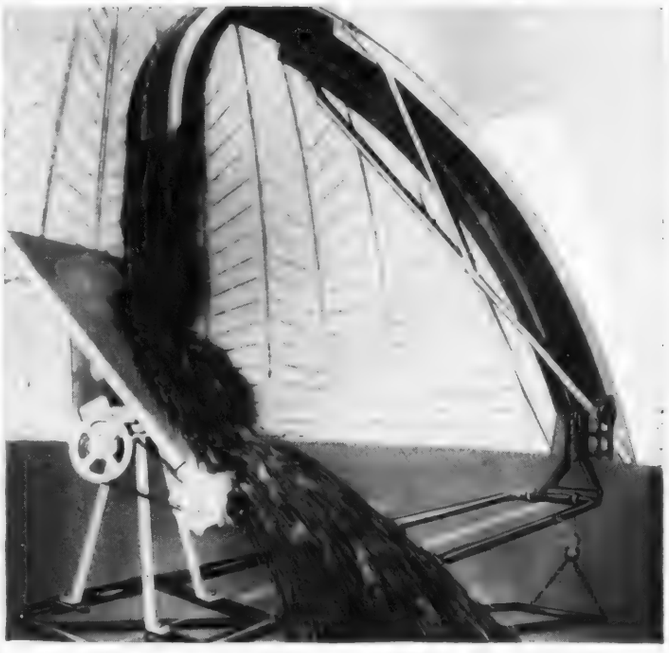
Brillion Iron Works, Inc., Brillion, Wisconsin, Dept. HC-3-3
Please send me information on the Brillion implements I've checked:

☐ Hay Conditioners ☐ Rotary Shredders ☐ Rotary Hoes
☐ Pulverizers ☐ Pulvi-Mulchers ☐ Sure-Stand Seeders
☐ Silo Unloaders ☐ I am a student

close to 40 degrees. When silages are wet at that temperature, it is practically impossible for the temperature to rise sufficiently for ideal lactic acid fermentation. Adding something fermentable helps to lessen the formation of butryic acid, the acid of rancid butter, which makes poor-tasting and poor-smelling silage. Cold silages almost always go with wet crops. If you wilt a crop until the temperature of the air and of the crop go a bit higher as the sun rises, and the crop goes into the silo at 75 degrees instead of at 40 or 45 degrees, the changed type of fermentation causes a great difference in the quality of the silage.

As a rule, preservatives modify the fermentation so that objectionable types do not occur. Preservatives are of three kinds —the chemical, like metabisulphite, the conditioners, like ground corn and the flavor additives, trade products like the one made of apple pomace, which improve taste and odor more than they preserve. I vigorously, loudly and persistently object to the frequent practice of using metabisulphite carelessly, though the proper use of the chemical is commendable, too. Frequently, the method is to put the crop into the silo as wet as possible, sprinkle a little metabisulphite on it casually, keep everyone out of the silo because the chemical is irritating, and then expect the chemical to be uniformly mixed by the flow of juice. It is hard on the silo, and it is wasteful of nutrients, for metabisulphite pulls a lot of water out of a crop. Properly used, the metabisulphite is not irritating. Merely diluting the chemical in water renders it harmless. An 80-pound sack should be dissolved in 24 gallons of water and 3 gallons of the solution spread from a garden sprinkling can on top of each ton of green forage in the wagon. So diluted, the chemical causes no irritation to men in the silo and the needed packing can be accomplished.

Ground grain conditioners add something more than carbohydrates to the fermentative processes. Possibly the vitamins, possibly the minerals in grains encourage the growth of organisms to a much greater extent than the amount of material present indicates. Ground corn cobs, because of their content of "beeswing", the name given to that fine dust from corn cobs



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- **You get more tons in per silo**
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- **Even mixed Feed, that unloads even**
- **Even weight distribution, longer silo life**
- **Better drainage, juices flow to center**

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Making oat silage is one of the latest, most practical ways to make this crop pay. Lundell "Super 60" crushes stems for better packing—is a top, farm-proved oat silage maker.

One acre does the work of two or three when you green-feed grasses and legumes or put up grass silage. Especially designed, clean-cut hammers cut grasses and legumes evenly.

A special row crop attachment for the Lundell "Super 60" simplifies and cuts the cost of making corn silage. Corn Head Attachment has only one main moving part.

Only ONE Machine Does These Year 'Round Farm Jobs

Lundell the first name in flail-type harvesters

The versatile Lundell "Super 60" Forage Chopper is designed for year 'round farm use. It *Cuts* • *Chops* • *Shreds* • *Mows* • *Crushes* • *Conditions* • *Windrows* • *Grinds*

*Many patented features & attachments

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Lundell Choppers receive world-wide acceptance.

In 1958, a Lundell Chopper was built and sold every 30 minutes—in factories in England, Australia, and America.

For full, free information write today. Or see your nearby Lundell dealer.

Dept. F-3

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Cherokee, Iowa

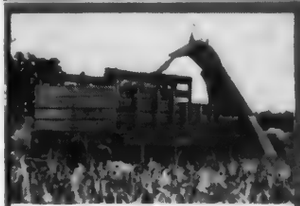
. . . shreds stalks for soil conditioning.

. . . chops hay out of windrow.

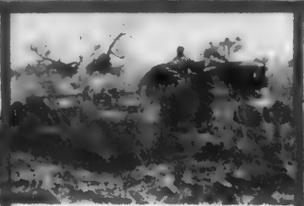
. . . grinds corn, small grain, cobs, baled hay, etc.

. . . busts bales for fodder or bedding.

In one operation you can mow, condition and windrow your hay crop. Saves time, money, labor.



. . . cuts broadcast cane.



. . . cleans weedy pastures.

. . . shreds stalks for bedding.

. . . saves a down crop.

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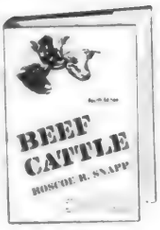
Wagon Hoist • Truck Hoists

FARM BOOKS RECOMMENDED BY THE EDITORS

Livestock Books



The Handbook of Feedstuffs — Production, Formulation, Medication—by Seiden and Pfander **$8.00**
640 pages in dictionary style.

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A carefully revised edition of this excellent book on beef production.

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Revised edition of this information-packed book.

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which is the little husks that stand up around each kernel, are an excellent silage conditioner. The beeswing is remarkable in its stimulation of bacteria and mold organisms. All conditioners are usually added at the rate of 125 to 150 pounds to a ton of green chop.

"Why not add more?" we are frequently asked. Why not pour on the grain, giving a complete ration so no dry grain need be fed later? At least 10 per cent of the nutritive properties of the grain will be lost in the fermentative process. If you have already preserved your grain crop, why waste 10 per cent of it? If your silage turns out to be poor, a lot more of the grain so mixed with it would be refused. Likewise, grain and silage mixed would give no opportunity to vary individual livestock rations according to production, unless grain were included in amounts to satisfy the requirements of the lowest producer, with additional grain fed separately to higher producers.

Silo Filling

The better the packing, within reason, the better the silage. Also, the greater the capacity of the silo. Most authorities recommend fast silo filling for better exclusion of air. I do not concur. Last season I had occasion to fill two equal-sized silos. One was filled in just under five hours with a high capacity blower. The other was filled by a small blower in short-day jobs over a

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Portable Irrigation

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Any farmer can make more money by watering crops with a Champion Portable Irrigation System. We supply pipe and couplings or couplings separately to fit any portable irrigation system. Champion Couplings are easiest of all to use. Joints lock automatically. Connect and disconnect pipe without stooping.

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The NEW PAPEC #60 UTILITY HARVESTER

The new Papec No. 60 Harvester will do more work per dollar invested.

Harvesting crops for "green feeding" and grass silage... picking up and chopping windrowed crops... clipping pastures... shredding cornstalks for bedding or mulch... shredding and spreading brush... These are some of the jobs you can do easier, at less cost with the Papec "60".

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- Hardened alloy steel rotor knives are shaped to cut and feed directly to auger.
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- Curved shear plates at blower throat have precision ground edges and are reversible.
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- Discharge pipe deflector controlled directly from tractor seat.
- Discharge pipe has automatic swivel control for wagon-box delivery. Turns on ball bearings.
- Auger cover *locks open* for pasture clipping and stalk shredding.
- Hardened, precision-cut bevel gears in main drive run in bath of oil.

The Papec No. 60 Utility Harvester has a full 60 in. cutting width. The height is adjustable from 2½ in. to 6 in. A 2-plow tractor will furnish ample power for many jobs.

You'll find jobs for the Papec "60" practically every month in the year. See it at your Papec dealer or send coupon for additional information. Papec Machine Company, Shortsville, N. Y.

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Dept. FQ3, Shortsville, N. Y.

Please send me full information on the Papec No. 60 Utility Harvester.

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Address_____

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with full mechanization

Gehl's *power idea* quick-times every operation — cutting, unloading, filling. The chopper, forage box, blower . . . a forage-making package muscled with brisk-stepping speed.

Out in the field the *Gehl Chop-All* works its way down big windrows as a winch rolls up a cable. Exclusive Power-Pac feeding system keeps the crop on the move. And Gehl Radial Shearing at the knives delivers the finest cut of all — shear uniformity on every round of the clean-cutting knives.

A *Gehl PTO forage box* rides the road to back-saving unloading. Does it with *power* — at the blower, elevator or trench silo. A touch of your hand puts the box in action . . . lets you sit back the few minutes it takes to unload. Ideal for bunk feeding too.

The full line-up of Gehl machines that completes the power idea

Hi-Throw blower | 1, 2 and 3 beater automatic unloading forage boxes | 1-row and 2-row corn heads | Self-propelled Chop-All | 6-ft. mower-bar

IT FOR YOU!

. . . *from field to feeding*

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period of two weeks. It took just twice as much silage to fill the slow-filled silo. Both silages were of equal quality. Don't assume that a 200-ton tower silo freshly filled necessarily contains 200 tons of silage. A quick fill can shrink to half in a few days and prove expensive if you have hired the work done. The rise in feet of silage in the silo is the real criterion. A rise of 1 to 3 feet per hour is about right.

The distribution of the silage in the structure is equally important. A slow rate of fill gives the tissues in the plant a chance to die and collapse and distribution is less likely to be a problem. The temptation is to allow the silage to build up in cones, which makes for uneven pressures that endanger both silo and silage. Distributors like the Even-Flo, made in Lafayette, Indiana, take the work out of the job and assure better packing of the material as it is blown in. In addition, the capacity of the silo can be fully utilized. Since mechanical distributors tend to distribute silage more firmly toward the walls of the structure, the juices run toward the center and find their way out of the drains instead of out of the side doors.

Is silage juice of any value? It is of no value if put back in the silage. There have been a number of devices patented for pumping the juice back, but in practice it runs right out again. Sprayed on fields, the juice has value as fertilizer. If left in pools around the silo, as is often done, it soon gives a stinking and unjustified reflection on silage, while attracting flies and irritating the feet of the cattle standing in it. A gutter and drain should be constructed or the juice can be collected in an underground tank as part of a liquid manure system.

So-called air-tight silos are misnamed, for air must and does get in and out, usually through a breather apparatus. With careful sidewall construction and the use of plastic covers on top of the silage, any silo can be made nearly air-tight. In my opinion, plastic covers are essential to any silo and they must be in complete contact with the silage itself.

One Man's Meat

As for silo structures, put me down as a tower silo man. In my opinion, plastic silos require considerable skill in silage-making. They are too easily damaged by weather, animals, birds and farmers. Their value is temporary at best. For emergency purposes, I much prefer paper wire silos, common in New York. The woven rings of 3-inch by 3-inch welded mesh wire with heavy paper lining are quite effective.

Horizontal silos, bunker or trench, demand more skill in silage-making than is usually available. I especially deplore self-feeding from horizontal silos. The good silage, such as it is, is just 2 to 5 inches away from the animals, with half-spoiled, mouthed-over, exposed silage the only kind always available. The animals eat it because they are starved to it. The advantages of horizontal silos begin to disappear when we consider the extra man-machine hours it takes to fill and empty the silos. However, horizontal silos, as such, are undeserving of blame for poor silage. The inferior products that most often come out of them are due to two factors, poor silage construction (not design) and sloppy silage-making methods. Too many farmers choose horizontal silos to get a lot of silo cheaply. They eliminate concrete floors and neglect to reinforce sidewalls or fail to provide adequate drainage. Then they follow up with a careless job of ensiling, all the way from length of cut through packing and covering. It is no wonder that a high percentage of such silage is inedible. The unfortunate part about trench silos is that proper fermentation and preservation in them requires more know-how than is needed in a conventional upright silo.

As with hay, the manner of storage of silage is important. If I were a farmer, I'd look forward to the wonderful day when I could afford three silos, one for grass and two for corn, all of them upright. Mixtures of corn and grass silages from two silos could be fed in proportions according to the quality of the varying batches as they were put in the silos. A ration of relatively constant quality would result. The third silo would be for carry-over, in case of less fortunate years. In time, I think batteries of silos will be popular, with built-in bucket elevators for low-cost

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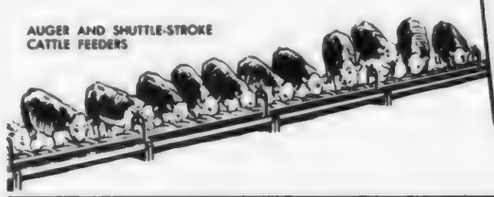

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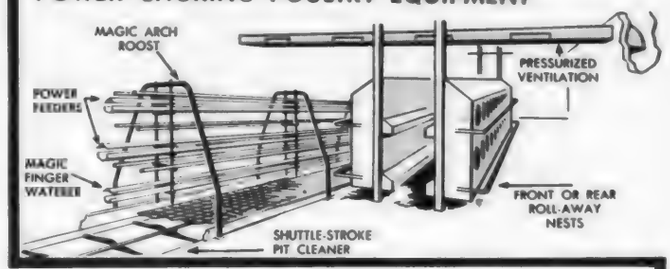

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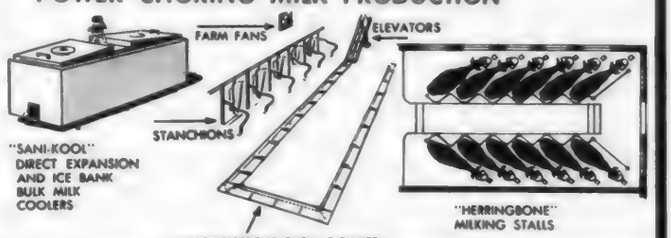

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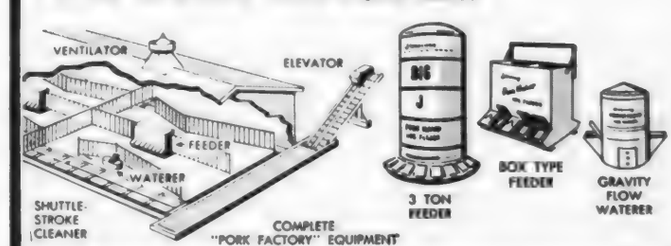

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silo filling. The elevator buckets, which some day I hope will be manufactured, would also provide even distribution for preservatives. Our old-fashioned silage blowers have always appealed to farmers because of the noise they make. Noise indicates power. Power, whether in a car, a truck, or a silage blower, is often confused with prestige. It is time we stopped farming to impress the neighbors.

THE AUTHOR: Dr. Rogers might almost be called Mr. Forage after 34 years of research and teaching on this subject.

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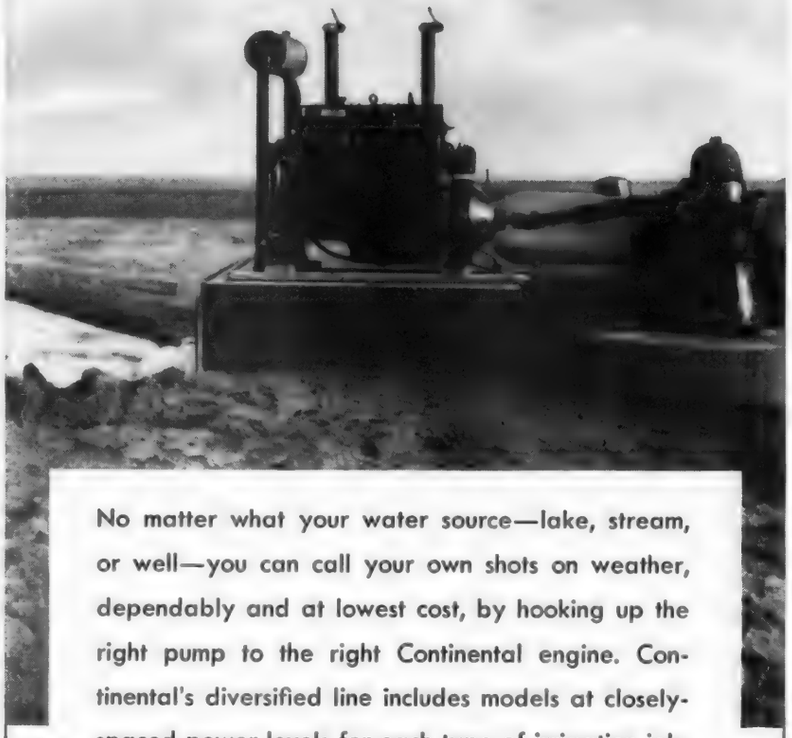

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HUNTING AS A CASH CROP

(*Continued from page* 58)

meadow legumes. The two are rotated from year to year to keep the soil built up.

Many operators plant their food and cover crops in long alternating strips with occasional clean strips at right angles to them. This makes field work easier and more economical than cutting the farm up into a collection of odd-shaped patches. If the strips are narrow and bounded by clean edges which force pheasants to the air, they'll work as well as irregular patches. Usually grain and sorghum strips are alternated with legumes and the two rotated from year to year.

Some game farmers, including Harold Hollister, rely on corn strips for food and cover requirements. However, a crop proving better than corn on many shooting preserves is sorghum, usually the dwarf, hybrid kind. County agents know the varieties best suited to a region. Millet and Sudangrass are also food patch crops, sometimes mixed with sorghums.

The seedbed should be prepared in the spring as for a corn crop. Seed the sorghum about two weeks after corn planting when soil temperature is 70 degrees.

Dwarf sorghums for pheasants can be planted at 4 to 8 pounds per acre in rows that can be cultivated once with a corn plow. After this cultivation, broadcast 12 pounds an acre of a millet and Sudangrass mixture. These crops should be fertilized at the same rate as corn.

Meanwhile, you can either raise the birds or buy them from game bird breeders. If you're planning to buy, it's wise to order in advance.

No one can tell how many birds you will need the first year. It is wiser to start small and grow as your experience increases. A couple of thousand pheasants probably will be all you can use the first year. Even the largest operators seldom use more than 10 to 15 thousand birds.

Pheasants should be about 14 weeks old at release time. Feed manufacturers will give guidance on raising and feeding these game birds. But it is pretty certain the cost

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of feeding pheasants to 14 weeks will come to 50 cents a bird if you raise a good part of your grain. If you buy the grain the cost will be about 60 cents. Buying day-old chicks, or from your own breeding flock, the total cost of a pheasant reared to releasing age comes to around a dollar a bird, not counting labor and building costs. Heavy disease losses or holding the birds much past the 14-week age will put the cost higher still.

Birds raised for the hunter must be strong flyers in good plumage. Hunters expect this at the prices they pay. They want the birds and the hunting as wild and natural as possible. Pheasants must be held in large pens where they can fly, and each bird needs 20 to 25 square feet of space to keep down cannibalism. Most operators also debeak them three to five times per season as the beaks grow out.

The holding pen should be at least 144 by 24 feet. The top has to be covered because the birds can't be wing clipped or brailled. Poultry netting is used which usually comes 150 feet to the roll, stapled to poles spaced 12 feet apart. It should be high enough that the man working in it can stand erect. The better the construction the less damage it will suffer from snow.

When you release the birds you're turning money loose in the field. But there are ways you can guard against excessive losses. The best plan is to release birds not more than an hour or two before the hunting starts. Put the birds down individually or in small groups in good cover. Haul them to the field in sacks or a few birds each in small, darkened crates not more than seven inches high. This restricts them and keeps them from panic. Release them as quietly as possible so they'll walk off and not fly until the hunters and dogs put them into the air. Mass releases usually mean a low recovery, in some cases as low as 15 to 20 per cent. Predators and crowding thin them down fast.

Operation Duck

While pheasants are the most popular shooting preserve bird they are not the only ones that will attract hunters. Farm reared mallard ducks are second in popularity. This is an entirely different type of operation. Wild ducks are migratory waterfowl and thus come under federal regulations. Those used on game shooting preserves must be at least two generations removed from the wild.

Some state laws require that the ducks be banded before they are released for shooting. Others require the operator to band them before they're transported from the property. Because of the law on second generation mallards the operators should keep records on all purchases and buy ducks only from recognized breeders.

John Moxley's Hill 'n Dale Farm at Medina, Ohio, has a typical duck shooting arrangement in addition to fine pheasant hunting areas. Moxley has a small pond down in a hollow. On a wooded hill behind the pond he has a feeding pen and a high

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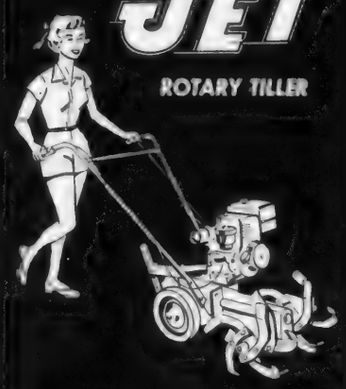

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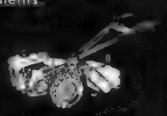

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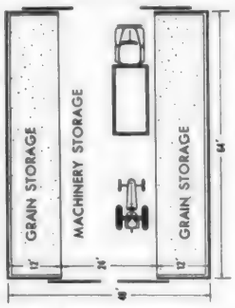

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tower. The ducks are fed here and as soon as they're old enough to walk to the pond Moxley's employees drive them down to the pond and back every day. As they gain strength they begin to fly part of the way.

When they're strong enough to fly the whole distance, they are driven up the tower from which they launch themselves for the downhill flight to the pond. They soon become creatures of habit and the feeding pen, the pond, and the strip of ground between are the only areas that interest them.

When the shooting season begins, hunters are stationed in blinds along the strip of woods past which the ducks fly at speeds of 60 to 70 miles an hour. This is tough shooting and often as difficult as hunting wild ducks. That's the way the hunters like it. Moxley raises about 1,100 ducks a year for this kind of shooting.

Six-week-old game farm mallards can usually be purchased for about $1.50 per bird, and day-old ducklings about 40 cents. The cost of feeding will come to four or five cents per week for each bird. Hunters are charged by the bird, usually $5 for each duck they shoot. The duck shooting course will have to be tailored to the landscape, but the pond should be 400 or 500 yards from the feeding pen.

If you're in an area where your mallards will attract wild birds it's best to give up the idea and concentrate on some other game bird because of a federal regulation against using live decoys to attract migratory waterfowl.

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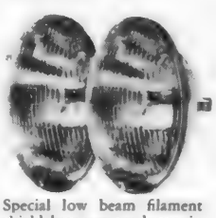

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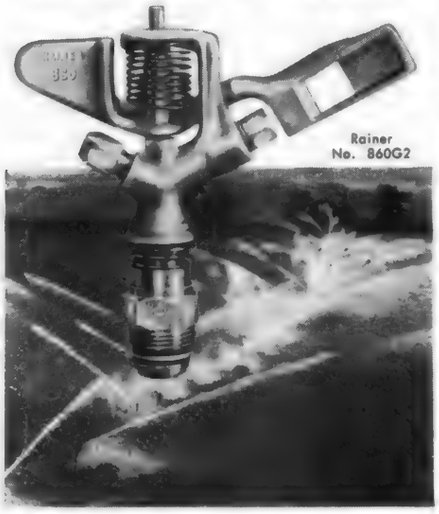

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Quail and chukar partridge are also being raised and released on shooting preserves. The chukar is an Asian import that weighs about 18 ounces. Coutrnix quail, a Japanese bird that weighs only four or five ounces, is getting a trial on some shooting preserves. But the quail and partridges, for several reasons, are less attractive to preserve operators than are pheasants or mallard. To begin with, they're small and a few ounces of quail are less attractive to the preserve shooter than three pounds of pheasant. Yet, the preserve operator has to charge almost as much for a partridge or quail as he does for a pheasant.

Quail and partridge also domesticate easily and won't revert quickly to the wild as pheasants will. The best plan is to begin with pheasants and determine later whether to also try quail and partridge.

Bird Dog

One big mistake made by beginning preserve operators is to fail to keep good bird dogs. Dogless hunters may often walk within a few inches of pheasants without flushing them. A good retriever also saves money bringing back crippled birds which might otherwise be lost.

The breed of dog used is less important than the individual. Sensible, trained dogs will work close to hunters, find the birds, point them and retrieve them. One of the best breeds, for both pheasant and duck, is the Labrador because a good one does a retrieving job on land or water.

Shop for good dogs and be willing to pay a fair price for good ones. From $200 to $300 for a dog broken to hunt can be a sound investment. Such dogs are probably the best money you'll spend in a shooting preserve venture. This is especially important the first year. After that, you may be able to raise a couple of pups a year and gradually build up your kennel.

Only the best of dogs will work alone with strange hunters successfully. Even such dogs should be worked occasionally by their trainer. Although most preserves allow a hunter to bring his own dog, the disadvantage is that a loose dog running wild can chase valuable birds off the farm.

Convenient parking areas are necessary as are guides who can get along with dogs, birds and people. Most preserves send a guide with every hunting party.

It is a mistake to over-crowd hunting grounds. Hollister never has more than 12 shooters in his fields at one time. Hunters often go out in groups of four with a dog and guide.

The preserve operator should keep a registration book whether the state laws demand it or not. It makes a good mailing list for his advertising letters. Good relationships with local newspapers will help get publicity. Mardel Preserve, the Kentucky bottomland farm, arranges an annual day for outdoor writers to come as guests and the practice pays off in publicity.

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Whether or not you plan to sell your farm or farm property knowing its true value on the market today and the long range earning possibilities are of utmost importance. For example, as described in a recent issue of FARM QUARTERLY, the law of eminent domain can take your property for public improvement or necessity. This is happening more often today because of the increased road building program. And for tax purposes and for insurance you should know its true value. A Professional Rural Appraiser can save you money and trouble . . . he will estimate the immediate and future value of your property or any part of it.

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Insurance

Wherever there are guns, dogs, men and vehicles, there is always the chance of personal injury and preserve operators need liability insurance. The best is an all-risk liability policy. No company has yet come up with a standard policy for shooting preserves. Although shooting preserves have excellent safety records, insurance companies shy away from their business unless a local agent is willing to push the application. A typical policy has premium payments of 75 cents on each $100 of gross business with a $50 minimum premium. The best plan is to try your own agent first.

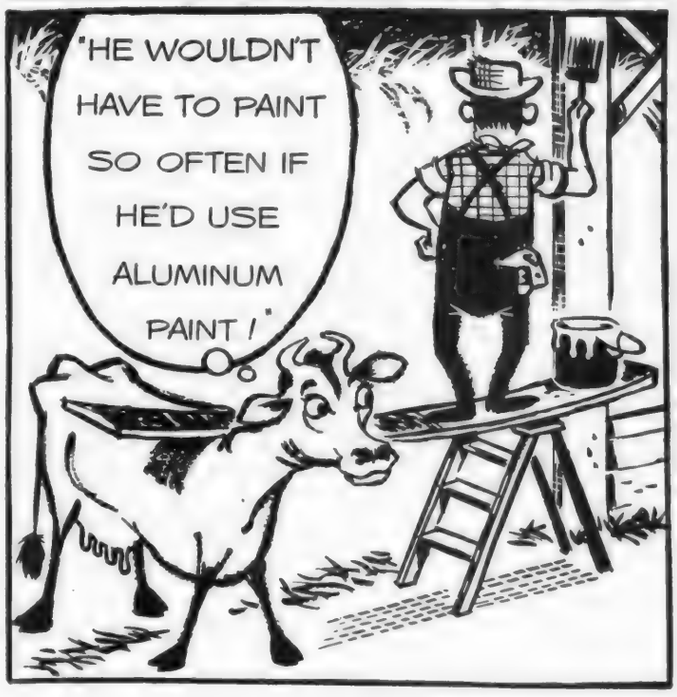
Once you have the farm arranged for the enterprise, and the birds available for your customers, you're faced with the question of how to charge for the privilege of shooting. Harold Hollister's plan of charging by the day with a limit on the number of birds is followed by about half the commercial preserve operators. And his prices, of $15 for three birds plus $5 for extra cock birds and $3 for extra hens shot, are about average.

John Moxley employs another common plan. He sells a limited number of memberships at $300 a year. For this fee each member may shoot 20 pheasants and 12 ducks. They may also fish in the preserve's ponds and can bring their families out for picnics and outings whenever they like.

Some operators take in company memberships and reserve all their shooting for the employees of a few companies. Under either plan you can figure that 70 per cent of your pheasants recovered is an excellent average and that $5 per bird on those recovered is a fair price.

A little multiplication makes this look like a fine deal. But there must also come a session in subtraction. Deduct the cost of birds, labor, feed, buildings, pens, dogs, licenses and publicity. The modern commercial shooting preserve can be a profitable farm enterprise though not exactly a gold mine. It's a business and can be a good one for the person who understands hunters and farming and has the knack of bringing the two together.

THE AUTHOR: George Laycock is a former editor of *The Farm Quarterly* who has turned to free-lance writing. Born and raised on a farm, he writes of farming and outdoor life.



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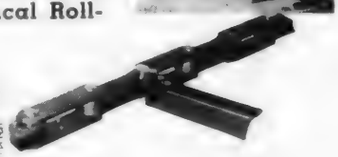

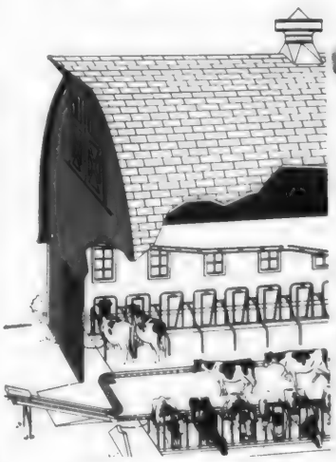

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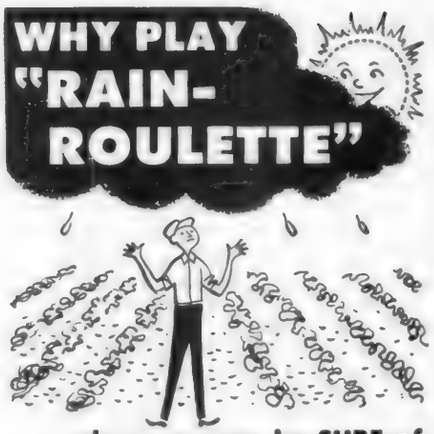

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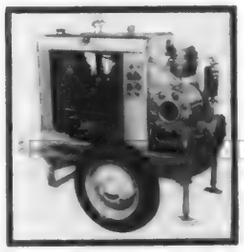

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HOW FAR CAN I PUSH MY CREDIT

(*Continued from page* 68)

check up to see where you are and where you'll be 5 years from now." They got the credit file and began to put down some figures.

It didn't take long to show John was using over $131,000 in his business. His annual income totaled about $21,500, out of which he paid in 1958 nearly $6,500 in interest and principal on debts. Other expenses came to about $12,700. Over $2,200 of his income was uncommitted. (See the table "John Dabney and His Pencil," page 68, for a listing of these and all other figures mentioned in this analysis.)

"You have a present net worth of about $88,000, according to these figures," Clausen told John. "That's a mighty fine record for a man who has been farming only 13 years. You have worked hard and if you keep up at this pace, you may be worth $106,000 in another 5 years.

"Millie and I have been wondering if it would pay to expand our dairy herd," Dabney asked. "We could handle 65 cows with the feed we have available, but I'm not sure we'd get ahead that way."

"Of course, you realize a dairy farmer is at a disadvantage here in this area," Clausen cautioned. "You get about $3.50 per hundred, based on a 3.5 test. It takes mighty good cows to pay out, especially if you have to hire labor. Your cows are good, all right, but I don't think they are good enough."

"I'm already in the dairy business," Dabney argued, "and the way I figure I would need only about $20,000 to put up the additional buildings, install a Herringbone milking unit and get the cows. I would need to borrow every dime, but I would have enough equity. Would that be pushing my credit too far?"

As John and Lew Clausen figured, they came up with some real eye-opening facts. For one thing, Clausen pointed out, the cost of new buildings could not be fully reflected in the sale price of the farm. "I'd guess we could reflect at most $5,000. You'll have to absorb a loss of $5,700 in putting up specialty dairy buildings like these. Your net worth will drop to about $82,000."

That was a blow, but in a cash grain area like this, John knew the banker was right. He would be struggling with a debt of $64,000, but with $82,000 equity it looked safe enough.

Income-wise, the figures didn't come up as much as John had hoped—only a little over $5,000 after allowing for the extra feed. By the time he had figured the cost of hired labor, extra meals and expense, there was nothing left. Instead of $2,200 in uncommitted income, John found that he would have to dig down in his pockets for over $2,700 to meet the payments. (Compare columns 1 and 2, "Operating Margins," in the table on page 68).

On a net worth basis the picture was just as discouraging. Sixty-five cows were not enough to make a two-man unit, and the

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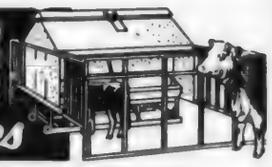

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figures proved it. "That's no solution for me," John observed.

"You're right," answered Clausen. You would be extending your credit either too far or not far enough. I would never advise extending a loan on this basis."

A New Tack

"What about feeder calves?" John asked. "Millie thinks I could cut down on my work that way. They could run on pasture and I wouldn't have to put up any new buildings."

"It might work. Let's see how it looks on paper," Clausen again suggested. "You could sell the dairy cows; pay off the loan on the machinery and put the balance in the bank if you want. In most years the bank will finance the entire cost of the cattle if you have the feed. You'll have to realize, though, that you are faced with some special management problems. For one thing, you'll have to keep a bigger bank balance or else borrow for operating and living expenses. Payday comes just once a year."

"That would be hard to get used to," John agreed, at the same time wondering if he could adapt himself to the cattle feeder's risks.

As they put the figures down, they decided to base the program on good calves weighing 400 pounds. "Their price jumps around quite a bit," Clausen observed, "but they'd cost at least 35 cents right now. According to University of Illinois studies, you can recover all costs if they sell for 26 cents, and you do a good job of feeding."

Considering the facilities, it was agreed that 100 feeders would be about right—at least until John picked up more experience. At 35 cents a pound, John found that he had an income of about $25,500, allowing for a 2 per cent death loss. Out of this he'd have to pay off his loan, leaving him better than $1,500 in uncommitted income. If things worked out, he could repeat this each year.

Going through the figures as before, John felt quite relieved when he found that he could meet all his payments and have over $1,500 left over (third column of table, page 68). "That's

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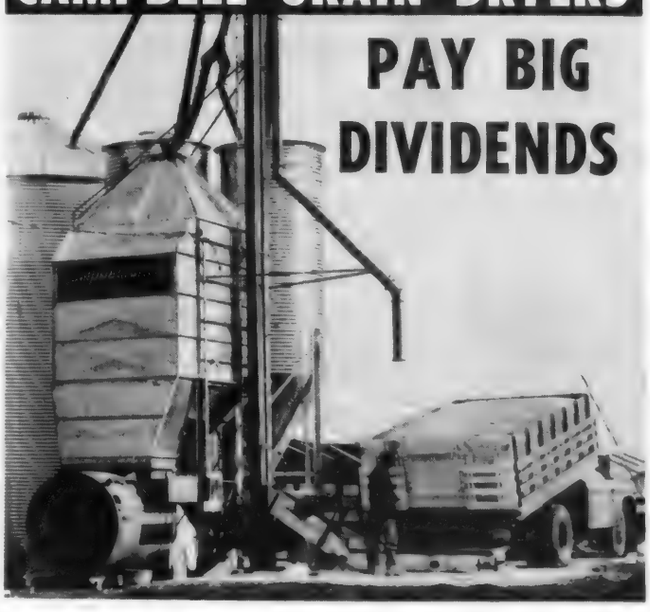

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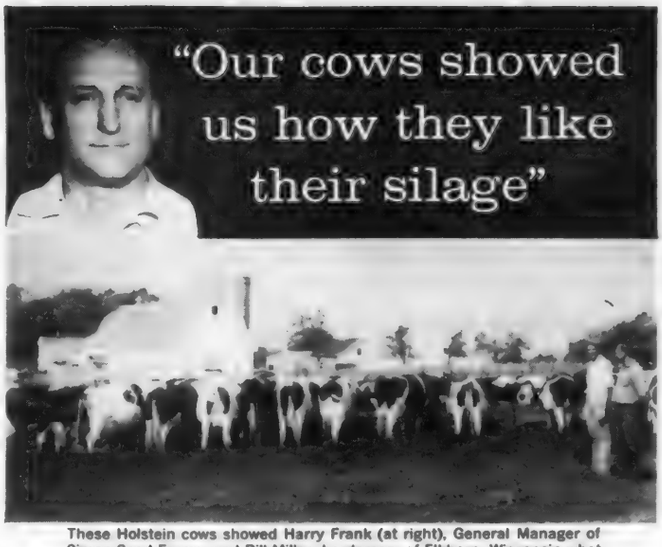

These Holstein cows showed Harry Frank (at right), General Manager of Simon Seed Farms, and Bill Miller, herdsman, of Elkhorn, Wisconsin what a difference 1 pound of Silo-Joy can make in a ton of silage.

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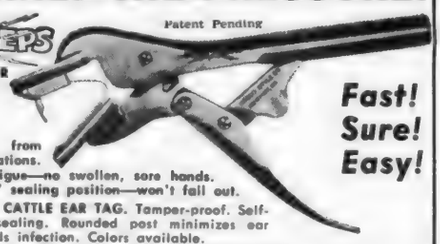
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not as good as now," he observed, "but I could slow down a bit, and if I worked it just right, maybe I could get away for a few days now and then. I might get a few sows and run some pigs back of the steers, too. That would help a little on the income.

"What I don't like about this program," John continued, "is that net worth picture. I'm used to making better book gains than that. But I guess you can't have everything."

More Land

"Maybe what I should do is buy up Aunt Peg's 80 acres. They would fit right into our 210 acres. What would you say to that, Lew? I think I could get that piece for $48,000. Would that be sticking my neck out too far?"

"Not necessarily," Clausen answered. "But that's a horse of a different color. You'd probably have to go to an insurance company or the Land Bank to finance that kind of a real estate loan, but let's give it the test."

If the dairy herd were liquidated, Clausen figured John would have enough money to refinance the entire 290 acres with a 30-year loan at 5½ per cent interest. The mortgage of $71,500 just about took John's breath away, but he figured he could handle the 290 acres plus the rented 80 he is now farming without having to buy any new equipment. His work load would be heavy during the growing season, but there would be other times when he could get away without anything hurting. The idea sounded good.

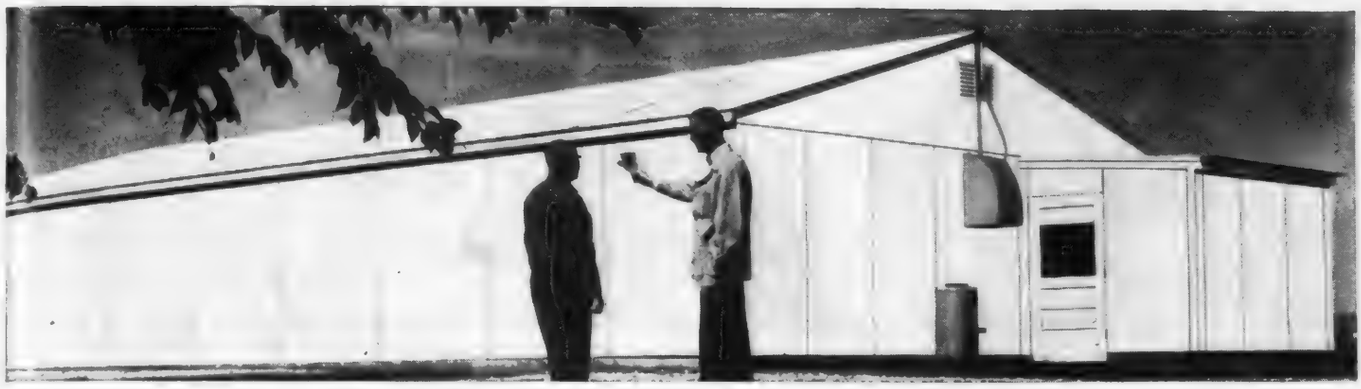
As they studied the picture, John's hopes sank as he realized all he could get out of the operation was a good living after meeting the interest and principal payments. "That wouldn't be so bad if my net worth picture would improve faster. What's wrong with those figures?"

"Nothing." Clausen answered. "The trouble is you are not busy the year around as you are with the dairy. Those figures are typical of a lot of straight grain farmers I work with. If you want to get ahead faster, you just about have to feed cattle, raise hogs, milk cows, or do something to keep busy. Suppose we try putting a 100-sow hog enterprise and a few beef cows on the big farm and see what would happen."

They agreed that the barn could serve as the feeding area. Eventually they might do better, but right now that would work. The farrowing barn and other specialty equipment, plus the sow herd, would cost about $20,000. This arrangement would put John in business on a 2-man basis.

"At $1.00 per bushel for corn, it is a fair shake if you can sell the hogs for $13 a hundred," Clausen observed. "That's about the way it averages out—sometimes better, as in 1958; sometimes not so good, as in 1955-56. If you can develop into a good hog man, you'll make money."

They figured on marketing an average of eight 210-pound hogs from each of the sows twice a year and selling 18 calves every fall at about 400 pounds. They estimated a



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price of 13 cents for the hogs, 25 cents for the calves.

"The pigs from 100 sows can eat a lot of corn," John observed. "Can you imagine running a 290-acre farm and renting another 80, and still buying corn? Those feed bills floor me, but I like the end results. On that basis I can meet all my payments and have almost $4,000 left over. And look at my net worth picture—it would improve over $6,000 per year. That's real progress. Dare I push my credit that far?"

Lew thought for a long moment. "John," he said, "you are putting your neck a way out. I'd suggest you and Millie talk it over. What I think you might consider is moving into this program over a period of 2 or 3 years. Get an option on that 80 acres right away, subject to getting refinanced on the basis we outlined. Next fall sell the milk cows and take a year to learn the hog business. Next winter may be rough on the hog farmer anyway. You could farrow 10 to 15 sows this year to get the feel of things. Then in a year or two, when you get the machinery loan worked down, you'll be ready to take on this program.

"One drawback is that you'll have to go up from a 4 per cent loan on the 210 acres to a 5½ per cent loan on the 290 acres. That's a real big jump. On the original $33,360, that amounts to $500 next year in extra money you'll never get to keep."

John came up with one more question. "Suppose land prices keep going up. What

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MOW'HAWK

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Introduced as a *budget-priced* cutter a few months ago, the Mow'Hawk sold just like it performed—spectacularly! This year—in spite of rising costs and higher prices elsewhere in the field—Lilliston's holding the price line. A superb value last fall, the amazing Mow'Hawk's an even bigger buy now! Your Lilliston dealer will be glad to show you why.

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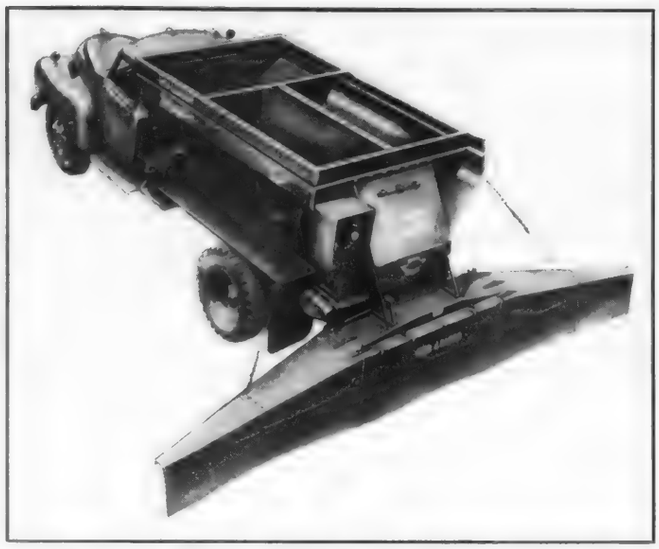

Shown above is the New Leader Mobile Blender with 3 seperate compartments.

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Whether you are spreading straight goods or mixed analysis fertilizer, you can save money with contract application . . . and here's why:

1. A truck mounted rig, such as the New Leader L-42S, can accurately meter *as little as* 50 *lbs. to the acre* to economically meet exacting soil requirements.

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3. You save your time and labor on storage, clean-up and equipment maintenance.

Believe it or not, a rig is now available that will blend up to three separate bulk fertilizers while spreading in the field. This rig is the New Leader "Mobile Blender" (Model L-42S), pictured above, which gives you all the economy advantages of spreading straight goods while meeting the exact soil analysis requirements for special ratios.

Also can be adapted to a stationary model for low-cost inplant blending operations. Write for complete information.

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would that mean to Millie and me in the next 20 or 30 years?"

"That's worth checking into," Clausen replied, "but nobody really knows what will happen to land prices. The rise or fall depends on many things, none of which we as individuals can control. Land prices have gone up almost every year since the bottom of the depression in 1932. A farm which sold for $100,000 last spring will, on the average, sell for more than $105,000 today. Four years ago the same farm would have cost only $85,000; when World War II ended, it could have been bought for less than $50,000.

"I am not about to predict that land prices will advance at that rate over the next 5 years. We'd all be better off if they didn't. However, if you allow 3 per cent per year, your present 210-acre farm valued at $95,000 could bring almost $110,000 in 1964. The 290 acres on the same basis would bring $166,000. Thus, to the net worth figure we have calculated, you may want to add something for inflation before you make up your mind completely. On the other hand, don't forget that in 1920 and in 1929 everyone was convinced that inflation would continue, and you know what happened. Never borrow money on a speculation like that."

"Well," said John, as he prepared to leave, "a little adding and subtracting can certainly go a long way in showing a man where his opportunities are."

Clausen smiled. "Every case is different, and you have to put it to the test to get the right answer. Markets, location—everything has to be considered. If we had a little better milk market, or if your cows were above 10,000 pounds, the picture would be brighter. However, you can't get away from the fact that this is not dairy country. Perhaps the reason is that other farmers have done some pencil pushing, too.

"What you need, as I see it, is a bigger farm plus a livestock enterprise of some kind. You have seen enough to know that pushing your credit $20,000 to expand your dairy to 65 cows is going too far. By contrast, you know that going up $55,000 to $60,000 to expand into a bigger corn and hog farm should pay."

In the one case taking on an additional $20,000 of debt was sticking his neck out too far. But raising the ante $60,000 on a sound, well-planned operation was not. Which is only typical of the answers which come out of a well-thought-out analysis of any potential piece of farm finance.

Dabney's case is a model. It is perfectly adapted only to his particular situation; yet the principles on which it was worked out are applicable anywhere.

To succeed in farming the young man must use all the credit he can handle. The question is largely one of his managerial ability. Before he borrows he should have a definite plan of repayment. He should outline his various alternatives, just as Dabney did, to see where his best opportunities lie.

Nye Bouslog, farm service manager for The Union National Bank of Macomb, Illinois, sets up these specific points as a guide:

Analyze your financial statement, paying particular attention to net worth, current or quick assets, current liabilities, total liabilities. The lender, of course, will be quite interested in your record of payment in the past. In estimating your potential production and the prices you will receive, stay on the conservative side.

Remember that it is dangerous to borrow an amount greater than your net worth. Preferably, hold your indebtedness down to not more than half your net worth.

No more than can be paid off in 3 to 5 years should be borrowed on machinery, breeding stock, limestone and such items. On these items it is always well to pay down at least 20 per cent.

Forty-five to 50 per cent of purchase price, or 65 per cent of appraised value is the maximum that should ever be borrowed on the purchase of a farm.

While every producer has occasion to use these piece-meal loans, today's farmer should think of his financing needs in terms of a broad line of credit, much as John Dabney did, and he should look for a lender who understands modern agriculture and has access to enough funds by way of correspondent banks or other

sources to take care of every need. When he finds such a lender he should stay hitched. Shopping for credit every time he needs a little money or a piece of new equipment is no good.

Real estate, of course, should always be financed on a long term, amortized note. Insurance companies, a few savings banks, and the Federal Land Bank are the best sources for those funds.

Banks and the Production Credit Associations are generally the best sources of credit for machinery and livestock loans and for operating capital.

Youth gives men like John Dabney a certain advantage in adjusting to changing conditions in agriculture. But the hard-earned experience of the older operator should never be underestimated. There comes a time, however, in the life of every man when he feels reluctant to switch operations. When such a man finds himself in John Dabney's predicament he will be faced with some hard decisions. For him the question of whether or not to extend his credit involves much more than a balance sheet analysis.

Credit, like most other economic concepts, is a matter of relatives. A $50,000 debt may be a millstone to a man who has contracted it without careful analysis; to the one who can use it, it is sheer inspiration.

THE AUTHOR: Earl F. Crouse is president of the Farm Business Council, Inc., an organization he recently established after many years as vice-president of Doane Agricultural Service. There he headed up all publications and economic research.

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A flash of hot air from a Heil dehydrator preserves alfalfa or other forage . . . fixes quality at the peak of nutritive value . . . puts crop in best condition for pelleting. In addition, dehydrating adds about 10 percent to the yield per acre. You save all the crop — leaf shattering and weather losses are prevented — and an extra cutting is usually possible. You can make hay every day . . . even when it's drizzling.

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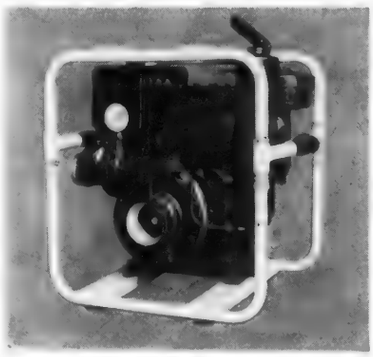
For low-cost irrigation of medium acreage. This PTO pump offers a wide range of volume and pressure. It is compact, efficient and economical to operate. It can also be used as a booster unit for systems already installed. Two models available—3PTF8 and 3PTF9. Both models have 3" suction and discharge openings.

With 550 RPM take-off speed, a "Tractor-Mate" will pump 350 GPM at 80 PSI.



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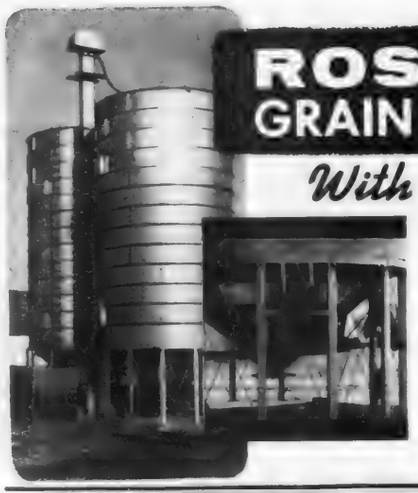

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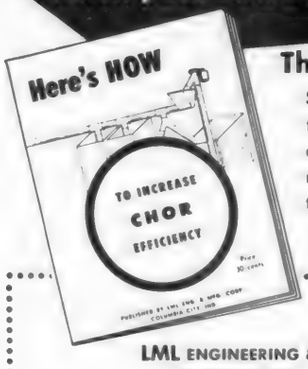

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Scientific Bulletin No. 3

Mysterious Vitalizer Gives Pigs Amazing Growth

One Injection of FE-50 Increases Weaning Weights Far Beyond Expectation

The biggest single farm news story for 1958 has been the amazing power one injection of iron dextran complex (FE-50) has had in the prevention of baby pig anemia.

Today, the news is more startling. Besides preventing anemia, FE-50 actually helps boost growth. Many farmers report that *by weaning time* their FE-50-injected pigs put on as much as 8 "extra" pounds.

Reduces Feed Costs—And FE-50-injected pigs frequently reach market 2 weeks sooner than untreated littermates. This faster growth can *save 70 pounds of feed per pig.*

Inject one shot of FE-50 directly into the ham of a 1-day to 14-day-old pig. Instantly the extra iron vitalizes his system.

Insist on Anchor FE-50

Only the iron dextran complex in Anchor FE-50 is capable of producing this "bonus vitality." FE-50 is carried in fresh supply by your nearby Anchor dealer. See him.

By the creators of True-Vac and Ery-mune

ANCHOR FE-50
ANCHOR SERUM COMPANY
Saint Joseph, Missouri

FIGHT ON BUGS AND WEEDS

(*Continued from page* 61)

acre, as a side dressing or mixed with a starter fertilizer and applied through the fertilizer attachment on the planter. There is also a new corn planter attachment made for applying granules in the row.

These recommendations are doubled when either large white grubs or large wireworms are the main insect enemy. Heavy soils, such as muck or peat, also call for an increase in the amount of insecticide used, from two to three times the amount recommended for the lighter soils.

Corn Borer

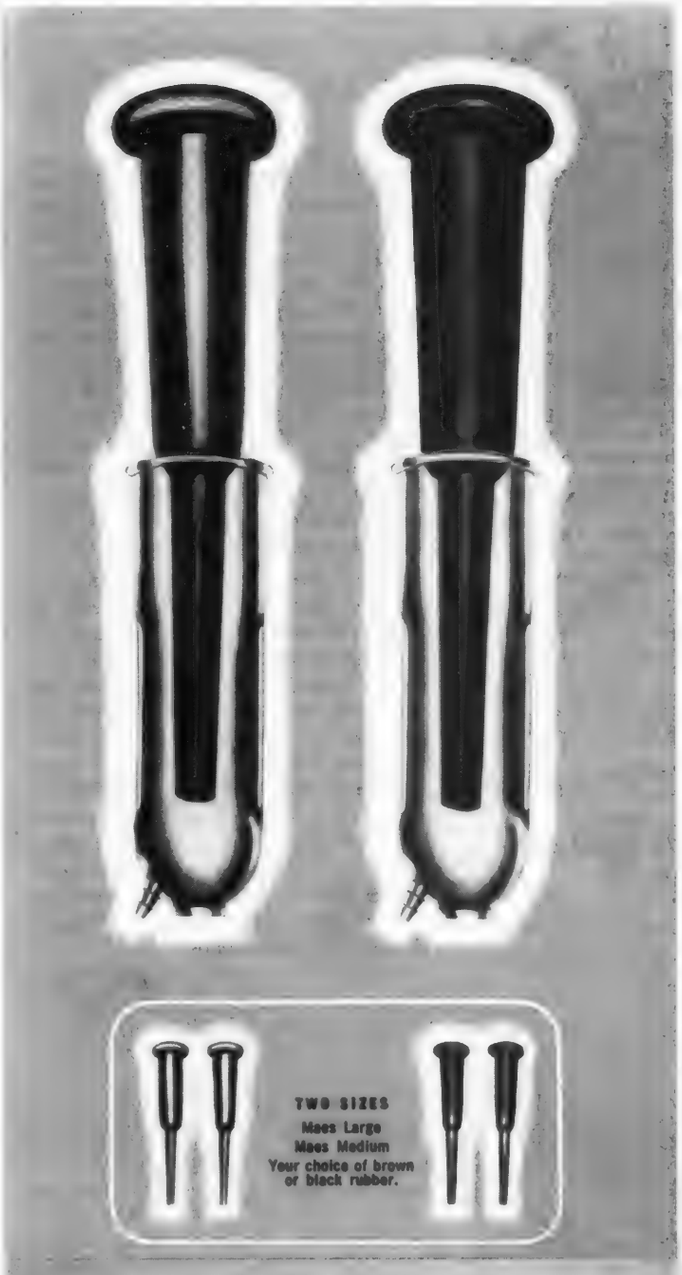
Though these ground troops may continue their subterranian attacks for some time after the corn begins its growth, they are not the only enemy the farmer must fight. Aerial warfare begins soon after the plant leaves break through the soil. One of the most destructive of these flying enemies is the European Corn Borer.

In June, the corn borer, which has spent the winter holed up inside the stalk of the corn plant, emerges as a small, night-flying moth. The female is yellowish brown, the male much darker brown. The female quickly begins her part of the attack by laying her eggs in groups of from 5 to 50 in scale-like patches on the underside of the corn leaf. Within her lifetime, she will lay from 500 to 1000 eggs in silvery white clusters about the size of the dented end of a corn kernel.

Within a week, the first eggs will hatch and the black-headed, almost transparent-bodied young worms will emerge and begin migrating to the protected spaces in the whorls and leaf sheaths, beneath the husks, and in the silks. Here they feed until they are about half grown, then they burrow into the stalk or the ear, sapping the strength of the plant and weakening it structurally. The multiple-generation strain goes on to pupate, emerge again as a moth, and produce a second generation. Further south, around the Boot-heel of Missouri, the longer season allows a third generation of borers each year.

Need for control of the borer depends on the growth of the plant. It has been found that the younger the plant, the less chance of borer survival and the less damage done.

At the University of Illinois, two entomologists, W. H. Luckman and H. B. Petty, have worked out what they call the tassel-ratio index. This is based on a comparison of the height of the tassel within the plant to the tallest leaves when stretched straight upward. They get their figures by measuring from ground level to the tip of the leaves pulled straight up; then splitting the stalk lengthwise and measuring from ground level to the tip of the growing tassel. Then they divide the height of the tassel by the height of the leaves and multiply the result by 100. "For example," Dr. Petty said, "suppose the height of the plant is fifty inches and the height of the tassel is fifteen inches.



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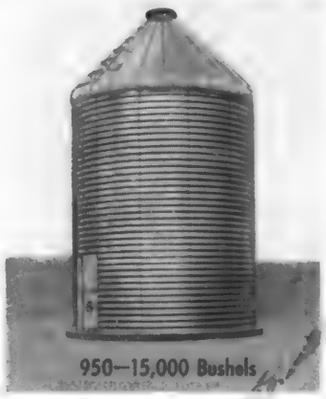

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- **Exclusive New "Eave-Seal"**—Another pioneering first! Now same rugged strength of sidewall extended from ground to roof peak. Behlen Commonsense design curves roof into wall panels for air-tight "Eave-Seal." Heavy ⅜" bolts with special nylon washers every 6-in. stops air-moisture leakage.
- **Strong, And How!**—Only Behlen uses *vertical* heavy duty 18-gauge steel sidewall panels with deep corrugation. Result, they are as wind-and-wear proof at the top as at the bottom.
- **Eliminates Hand Scooping**—Behlen's exclusive "Steep Pitch" roof design follows the natural ^ of free-flowing grain . . . lets you fill your Tank to the peak without hand-leveling.
- **Weather-Tight**—Non-aging rubber strips seal weather, insects, and rodents out.
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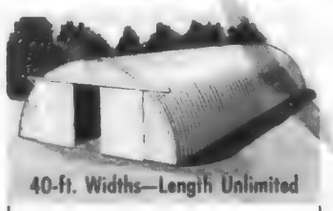
- **Natural Air Drying**—Behlen's optional Natural Air Drying System conditions your grain as you *dry without heat* . . . completely engineered from recommendations of the USDA and leading Ag. Colleges.

New Behlen Curvet with MORE Vertical Side Wall for Combined Grain-Machinery Storage

If you anticipate a 2-year crop of 8,000 bu. or more, this is for you:

- **Almost Straight Side Wall Capacity**—Behlen's exclusive *full-arc* construction gives you almost as much vertical storage space near the walls as you get in a regular steel building. Proof: 16-ft. combine and 2-row picker, with truck in between, can be stored across width of Curvet. And at 30% under cost of straight side walls!



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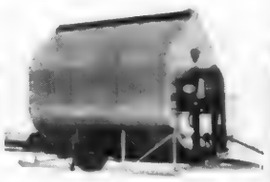

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- **4 Big Sizes**—250, 375, 500, and 750-bu. capacities. Operate off PTO or electric motor . . . burn propane or natural gas.

Corn Cribs

- **"Steep Pitch" Roof** — Design follows the natural ^ of free-flowing corn . . . fills to the peak without hand scooping.
- **Easy Unloading**—Extra-wide doors permit corn removal by your tractor's front end loader.
- **"Extra" Zinc**—No. 2 gauge steel Bar Mesh is galvanized *after welding* with up to 6 times more zinc coating.
- **All Sizes**—From 611 to 1940-bu. cap.

Also Heat Blowers, Aeration Fans, and Ventilators and Tunnels. Write for dealer's name and full information.

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PURCHASE Plan

Fifteen divided by fifty is three tenths. Multiply this by one hundred and you have the tassel ratio which is thirty. Not all plants will have the same ratio, of course, but the average of six representative stalks in the field gives an accurate index."

They have found eggs laid on corn with a ratio of from 1 to 20, hatches very few borers that live. When the tassel emerges from the stalk, the ratio is between 60 and 75, by this time most of these first generation borers have left the leaf whorls and are boring into the stalk or ear where they are safe. For these reasons, they recommend treating an infested field when the corn has a ratio of between 30 and 50. Tractor-mounted pull-type units cannot get over the fields much after corn reaches a ratio of 35; with high clearance equipment or with airplanes, the ideal ratio for insecticide use is between 40 and 50.

Another entomologist, Stirling Kyd, of the University of Missouri, suggests the same sort of timing by recommending the farmer apply insecticides not earlier than ten days before the plants will tassel. He agrees with the scientists at Illinois that only fields in which 75 per cent of the plants show fresh leaf feeding scars in the whorl leaves should be treated. "What are leaf feeding scars?" Kyd asked rhetorically. "They are little, irregular, brown-edged holes in the leaf. Sort of tear-shaped like this ○○○○." He laughed. "Without drawing, it is like trying to describe a goatee without using your hands."

Treating for second generation borers depends on the infestation and on the control that has been done on the first generation. Usually, late planted corn which has not yet tasseled or which is still in the pollinating stage when the moths are laying their eggs is most severely damaged by the second generation borers. These fields should be treated when one or more egg masses per stalk can be found. The insecticide should be used at the time the first eggs are found to be hatching.

Some entomologists make their recommendations easy by simply saying, "If you've had a heavy first brood—bad

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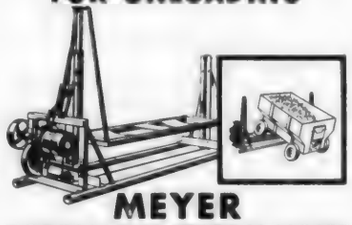

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enough, let's say, to require treatment—then, any corn still in the green silk stage by the last week of July or the first of August should be treated for borers. We know there will be enough second generation to warrant the treatment. Treat about the first week in August."

For either generation the chemicals used are the same, though the method of application varies slightly. The difference is that in spraying for first generation borer the spray should be directed into the leaf whorls; for second generation borer, the whole plant should be covered uniformly.

Several chemicals are available for borer control. The best known is DDT. As a ground spray it is applied at the per acre rate of 3 quarts of 25 per cent emulsifiable concentrate mixed with from 10 to 50 gallons of water—experts agree the more water the better. Sprayed from the air the dose would be 3 quarts of the same material in 2 to 3 gallons of water. Using 5 per cent granules, use 20 pounds per acre.

Stirling Kyd also recommends using 15 pounds of 10 per cent toxaphene granules, or 20 pounds of 5 per cent heptachlor granules distributed from either a ground rig or from the air. This year, the powerful chemical Endrin is also available as either a spray or a granular material. This is applied at the rate of 0.20 to 0.25 of a pound of the actual material per acre.

Corn sprayed with DDT or treated with toxaphene, DDT, or heptachlor granules should not be ensiled for dairy cattle or animals being fattened for slaughter. Corn treated with Endrin can be used for silage 45 days after treatment if the chemical has been applied but once. Silage corn may also be treated with parathion at the rate of ½ pound per acre, but this should be done only by professionals who have had experience with this hot but useful material.

Chinch Bugs

Though the sun-loving, evil-smelling chinch bug can fly in its adult stage, it is as wingless infantry troops that it attacks corn. The bug over-winters as an adult and as soon as the temperature reaches 70 degrees for several hours each day, it flies to the nearest field of green grass—usually a wheat field—to mate and lay eggs. When the wheat begins drying before harvest, the young bugs from these eggs set out on a

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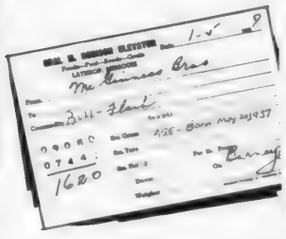
Left: R. C. McGinness, 6'2" tall, with Purebred Charolais bull—one of the future McGinness Ranch Herd Sires.



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Use Your Veterinarian

Every $1 invested in his services returns $5.78 to you

by George Eaton, D.V.M.

Here's how you can reap the actual dollars and cents value of modern animal health practices available through your veterinarian.

IT WAS COLD. The season's first arctic blast had swept across the plains and homesteaded the Midwest.

Roy Applegate didn't like it. But he liked what he saw before him even less, a lot less. He leaned forward for a close look at the motionless hogs lying in the pen.

"Want me to call the Doc?" his son asked.

Roy thought for a moment, squinted at the morning sun, and said, "No. Tell Mother she better call Old Man Stone. We'll see what he says first, it won't cost us anything.

Old Man Stone, always a neighborly soul, answered the call for help and gave Roy Applegate the kind of advice he gave everybody so freely.

Within three days, half the lot had died. *Then,* Roy called the veterinarian. He diagnosed the disease correctly and took immediate and effective measures of treatment. Losses stopped within 24 hours.

But the damage was done. A year's profit was gone. The good intentions of a so-called "expert" showed-up in the loss column.

Use Your Veterinarian

Recently, the American Veterinary Medical Association made a field study to discover what a veterinarian is worth to livestock owners in dollars and cents. The findings: for every dollar spent with a veterinarian, the livestock farmer received an estimated $5.78 in return. An excellent reason why it's good business to use a veterinarian.

The $5.78 return-on-your-investment figure is impressive, especially when you consider that 55% of the national farm cash income is from the sale of livestock, and that livestock diseases rob farmers of approximately $80 every second the clock ticks. The livestock industry, vital to agricultural America, is losing an important share of its income.

Through the persistent efforts of practicing veterinarians, research veterinarians and farmers, the war against livestock diseases has been waged successfully on many fronts. Important gains have been made. Every member of the profession is constantly on-guard in the battle for complete eradication of livestock diseases. They work for further progress and are always alert to new developments in the diseases of farm animals.

Economic Value

Due to the work of men like your veterinarian, losses from Bangs Disease dropped from $92,000,000 to approximately $40,000,000 in a 10-year period. And each time the disease goes down one half of one percent, $17 a minute is added to the profit column of the nation's livestock men.

Similarly, veterinarians are working on eradication of mastitis, which costs cattlemen $616,438 every day. Leptospirosis is whittling away at farm income at the clip of $2,115,300 per week. In the last two years, the veterinary profession has developed a vaccine which will prevent this disease.

Hog Cholera, an old and dangerous disease, costs $5,777 each hour of every day despite widely used preventive measures in the form of a safe vaccine developed by veterinarians.

A bacterin, developed directly through the efforts of practicing and research veterinarians, has given livestock farmers the means to almost completely kill the threat of loss from Erysipelas in swine. However, due to the lack of vaccination, $65,753 in production still is lost from this disease every time dawn breaks on a new day.

Internal parasites are a farm profit robber to the tune of $400,000,000 annually, or $11 every second. They are a prime target of today's veterinary profession. Swine losses have been $275,000,000 a year, cattle losses nearly $40,000,000.

Advanced strides in the treatment of livestock have paralleled the advancements in human medicine. Wonder drugs and antibiotics, developed primarily for human medicine, have been used hundreds of times more in volume in animal medicine. Consequently, the economic importance of these advancements are brought home to your barn lot when you use the services of your veterinarian.

Why Use a Vet?

Complete eradication of animal diseases is the ultimate goal of the veterinary profession. Recognition is the first step. Once the disease is identified, and a preventive treatment developed, the means to fight it is available.

Preventive treatment, diagnoses, and actual treatment of the disease are jobs done best by your veterinarian, because he knows the right way to fight the right disease.

Your veterinarian will cooperate closely, because he appreciates the importance of timely vaccination to you and the community. He does the job correctly, safeguarding the animal's health at all times.

The veterinarian's special skills—prevention, diagnosis and treatment—are vital in lessening financial loss on the farm. His $20,000, six-year education and experience qualify him as the expert in your community who can do the job for you, with more than 5 for 1 return on your dollar.

Glad to Help You

You will find your veterinarian equipped with modern instruments, drugs, facilities and the know-how to do the right job the right way. He has literature available to help you learn more about your part in animal health and care. Ask him for it. He'll be glad to help you.

Above all, *use* your veterinarian—to prevent animal diseases, to diagnose suspected diseases, or to answer *any* questions concerning the health of your animals. You will be assuring yourself of a more solid foundation for net profit from livestock production. For every $1 invested in veterinary service, you get $5.78 in return.

Research Laboratories, Inc. sells its products only through the graduate veterinarian: the key to better animal health practices on the farm.

Research Laboratories, Inc.,
Saint Joseph, Missouri

pilgrimage to find a fresher, more succulent grass crop. Too often, this is a field of corn. The presence of a full-scale, heavy attack of chinch bugs is usually seen in the wilting of the outside rows of corn—those nearest a grain field.

The timing of the fight against the chinch bug certainly proves the old adage about a stitch in time. If the infestation in the grain field is severe, the field may be sprayed with eight ounces of dieldrin or three or four ounces of Endrin per acre. If Endrin is used, 45 days must elapse before harvest. Dieldrin may be used seven days before combining. If they have not been sprayed in the grain field, they may be prevented from leaving it alive by spraying a barrier strip a couple of rods wide between the grain field and the corn or sorghum fields using the same dieldrin or Endrin spray. If the bugs are not discovered until the corn field is infested, the crop may be sprayed at the same rate for both chemicals. The spray should be directed onto the plant itself with between-the-row nozzles plugged. If the corn is high, use drop nozzles to get onto the lower stalk.

Spraying the crop, however, has its disadvantages. Corn sprayed with dieldrin may not be made into silage for dairy or fattening animals. Endrin must not be used within 45 days of harvest.

Grasshoppers

Grasshoppers, the USDA warns, are likely to be more widespread in the West and Midwest during the summer of 1959 than they were last summer. They, like the chinch bug, can be treated cheaply by being treated early. They will come to the cornfield from their hatching grounds which are usually along fence-rows, in uncultivated pasture land, or along roadsides. If they can be caught as they emerge from the buried pod in which the eggs were laid, they can be dealt with quickly and easily. They usually stay around the hatching beds for a week or so only, so speed is of the essence. If a mass attack hits the corn, the whole field must be sprayed.

If the hoppers are caught early, either on the hatching beds or in the fields, they are more vulnerable to the poisons. In the spring, sprays which put the following amounts of chemical on an acre will do the job: dieldrin, 1 ounce; aldrin, 2 ounces; heptachlor, 2 ounces; toxaphene, 1½ pounds. Later in the summer, the per acre doses must be increased to: dieldrin, 1½ ounces; aldrin, 4 ounces; heptachlor, 4 ounces; toxaphene, 2 pounds.

These chemicals perform differently under different conditions. Stirling Kyd points out that dieldrin and toxaphene will give a much better kill when the temperature is over 95 degrees than will aldrin or heptachlor. On the other hand, corn sprayed with dieldrin or toxaphene may not be used for silage to be fed to dairy animals or those being fattened for slaughter.

No one can accurately predict the battle we will have in the Corn Belt with the fall

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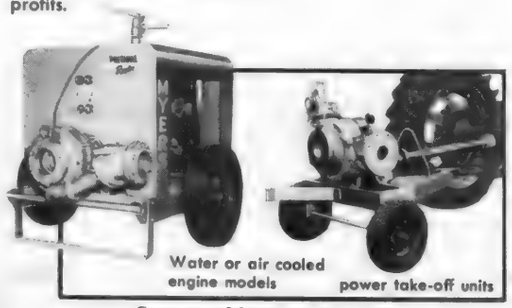

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army worm this year or any year, for none of them over-winter as far north as the corn country. Each year is a new invasion. Around the Gulf and in Central and South America this cousin to the true army worm and the army cutworm lives the year around, but they cannot survive where the ground freezes hard. In the spring, swarms of the dirty gray moths begin flying north—often hundreds of miles in a flight. When they touch down they begin laying their thousand-egg brood in patches of around 150 eggs which are covered with the hairy down from the moth's body. These hatch in a few days and begin eating the green plant on which the eggs were laid. As the worm grows to its full size, around an inch to an inch and a half long, its appetite increases at an alarming rate and masses of the striped worms begin migrating. They consume practically every green plant in their way and then, suddenly, the entire mass of them disappears. "As though the ground had swallowed them up," as one farmer put it. And he was right. As though at a command from the general, the whole army burrows into the ground to pupate. Two weeks later they emerge as gray moths and being another long flight northward to repeat the whole cycle.

If this enemy strikes in force, we have the chemicals to deal with him. He can be either sprayed or granulated. Sprays composed of 2 pounds of toxaphene, 1½ pounds of DDT or 4 ounces of dieldrin mixed with at least 12 to 15 gallons of water is the recommended per acre rate. If granules are used, the recommendation is 15 pounds of 10 per cent toxaphene, or 20 pounds of 5 per cent DDT, or 15 pounds of 2 per cent Endrin per acre. The same silage restrictions again apply. Corn treated with DDT, toxaphene, or dieldrin should not be used for silage for dairy or fattening animals. Corn treated but once with Endrin may be ensiled after 45 days or longer.

Spray or Granules

The introduction of granular insecticides has made our chemical weapons against the bugs more versatile. The advantages of the granular formulation are important in some respects, though spray has its advantages, too. Granular formulations, for example, are believed to have a longer residual life and they can be put on a field without the extra problem of hauling hundreds of gallons of water (each gallon weighing eight pounds) as a carrier. Granules also have a distinct advantage over spray and dust when applied from the air—a plane can carry a greater pay load and deposit it more accurately with less drift. There is also a lower danger of irritation or contamination from the use of granules than from sprays. And, finally, with insects such as the corn borer and the fall army worm which feed in the leaf whorls, the granules roll down the leaf into the whorl and produce a higher concentration of insecticide.

Sprays, on the other hand, have a distinct advantage in fighting insects which feed out on the leaf. For most jobs sprays and granules have proved to be equally effective. As one entomologist said, "Most often, it isn't the form of the insecticide, but the time of application that's important. We've seen case after case where the difference between a sixty-five or a ninety per cent kill was caused by timing whether spray or granules were used."

For many of these same reasons the herbicides used to control weeds are now coming in a granular form to give the farmer a wider choice of methods of application. For pre-emergence weed treatment in particular, the longer residual life seems to give the granular formulation an advantage.

Weeds

Too late for very extensive use last year, a new and amazing chemical, Simazine, was granted a label by the Food and Drug Administration for use on corn. In our war on weeds this chemical is like a barrage which hits only enemy troops. Used at the rate of two pounds per acre it will kill both broad-leaved weeds and grasses and yet spare that one important grass, corn.

In testing this chemical in 1956 and 1957 most observers found it to be near perfect. Tests in 1958, however, showed it had one weakness. "We used Simazine on some extremely weedy Missouri plots in 1956," Hale Fletchall, of the University of Missouri, said, "and it decreased the weed growth in corn at

harvest time from the 3,700 pounds of dry matter per acre which we had in the control plots to 19 pounds per acre. And that was without the aid of any cultivation. The uncultivated check plots averaged 45 bushels of corn per acre while the uncultivated Simazine treated plots yielded 106 bushels. Check plots which were cultivated three times yielded 80 bushels and contained 1500 pounds of dry weed growth at harvest time."

The trials with Simazine in 1958 told a slightly different story. In many cases the same spectacular results were achieved, in other fields the chemical held the weeds in check for six weeks or so before they broke through, and in one or two cases the chemical seemed to do no good at all. The poor showing seemed to hinge on one important fact—the chemical requires a good rain within 10 days to 2 weeks after application or it cannot do a job. In 1956 and 1957 the rains came and results were spectacular; in 1958 there were spotty droughts and some failures.

So powerful is this chemical, it is being used industrially to prevent any plant growth in factory yards and along rights-of-way. We know there are weapons which are so powerful they will kill the enemy and everyone else, too. Is Simazine such? Tests show that some damage can be expected in a crop following corn the same year, but little damage has been found to crops a year after the Simazine was used.

This year most of the Corn Belt agronomists are recommending farmers try Simazine on a limited basis with the warning that it takes moisture for it to work. The chemical is applied as a wettable powder at the rate of two pounds of the actual chemical to the acre. It is sprayed on the land after the corn has been planted but before it comes up. The chemical comes as a very fine powder which does not dissolve in water—therefore, the by-pass hose of the sprayer must be kept down in the spray mixture near the bottom of the tank to insure thorough agitation. Screen in the nozzles, as well as the suction lines, should be no finer than 50 mesh size.

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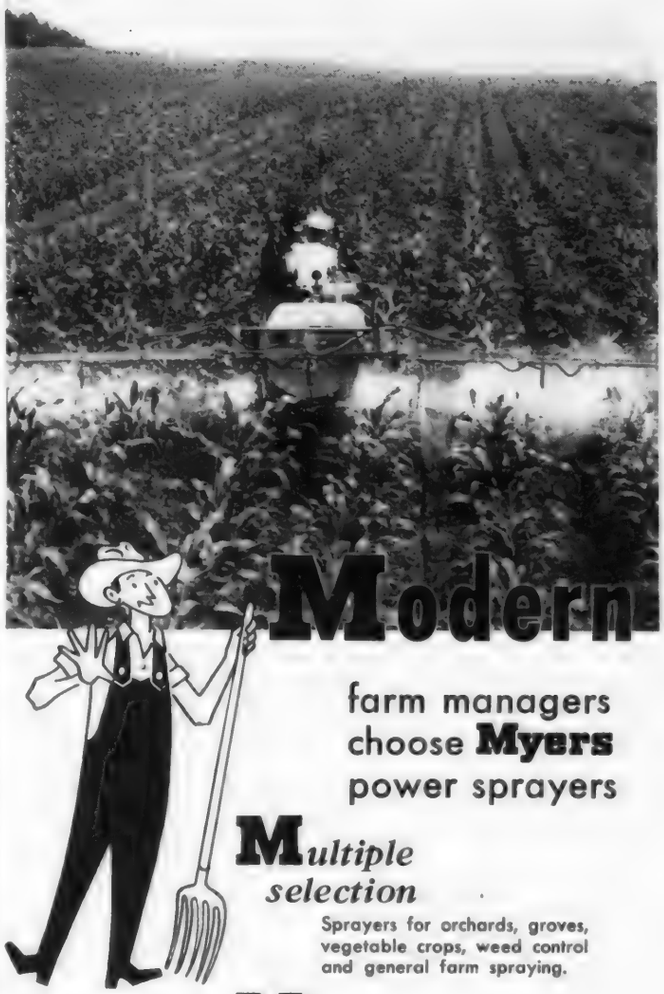

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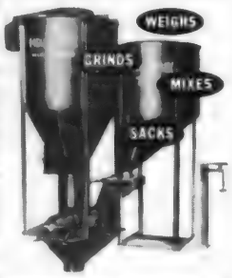

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to strike the enemy a death blow before it is mobilized for battle is Randox. This relatively new material is being recommended in areas where the major enemy is made up of annual grasses. It is very effective against grasses; less so against the broad-leaved weeds. Both corn and soybeans tolerate Randox. It should be applied between corn planting and the emergence of weeds at the rate of four pounds of the actual chemical to the acre. Like Simazine, Randox needs rain after it is applied, but it needs less rain than Simazine to make it effective.

A third new pre-emergence weed fighter which needs still less moisture after application than either Randox or Simazine is Eptam. If disked lightly into the soil, it will go to work on grasses.

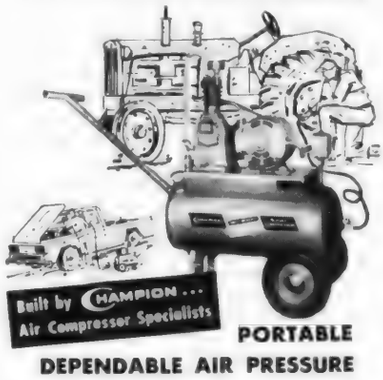
Eptam, incidentally, is one of the chemicals which is being used in place of a nurse crop for legumes. (See "Chemical Nurse for Legumes", THE FARM Quarterly, Winter 1959.) Used in this fashion, Eptam may now be applied 60 days before harvest.

These three chemical are all rather expensive, costing in the neighborhood of $12 per acre. For this reason, considerable work has been done with band application designed to keep the weeds out of the row itself. Applied during planting through a Tee-Jet 8002E, a band 12 to 14 inches wide centered on the row is applied behind the planter shoe. Important in preventing drift is the pressure which should be maintained between 20 and 40 pounds per square inch. Applied in this way, these three weed killers cost around $4 an acre. The great drawback, of course, is that between the rows requires just as much cultivation as unsprayed corn. Many weed specialists feel that a general application of 2,4-D is more practical than band spraying.

This first modern weapon against weeds, 2,4-D, is still one of the most useful. Usually it is used as a post emergence treatment at the rate of a quarter of a pound acid equivalent in the ester formulations and one-half pound in the amines. More and more farmers, however, are turning to the use of this chemical as a pre-emergence spray. Using the ester formulation at the rate of one to one and a half pounds acid equivalent per acre applied just after planting, they are finding they can control the annual weed grasses as well as the broad-leaved weeds that emerge within the first three to five week period. As one farmer said, "I've known many wet years when control during the first six weeks when you couldn't get on the land made the difference between holding the weeds in check or having them take over and smother the crop."

In the battle against weeds and bugs, these are some of the armaments available today. More will come to give us an even greater advantage in this endless fight. We are not about to participate in a disarmament conference with this enemy.

CHAMPION Farm Master PORTABLE AIR COMPRESSOR



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ONE-LITTER GILTS

(*Continued from page 78*)

systems. Here are the topics a prod produces:

Poor Milking: "A pig will eat feed sooner on a gilt than it will on an old sow. Early weaning is fine, but only if you can get the pigs to eat. Two things are important," said Doak, "we keep the gilt confined and we have creep feed there all the time for the pigs. A pig won't eat anything until it's hungry. Nothing's as appetizing as mother's milk, and when he's getting enough of that he won't eat anything else. I would rather have a litter eating a good, balanced formula at three weeks old than come off an old sow fat and happy at six weeks. The change is too much for 'em.

"We confine our hogs after farrowing. An old sow, or a gilt, will drag a pig all over the field on one teat. She can't eat from the creep—so there's no reason for her to hang around. When she leaves, the pigs go with her, and you get the loss—you lose the baby pig bloom and the baby pig fat. That's why we confine the gilt and the pigs, and give them a rolled oats balanced formula prestarter and we have the pigs eating pretty good at 14 days. We wean at 40 days and they go right on from there."

Labor and Equipment: "You can keep these gilts in temporary lots with temporary fencing and housing until they go into the farrowing strip. They never go out onto the farm again. So you keep down disease, and labor.

"We don't ring the gilts. It's my theory you can bring on infection by too deep ringing or hitting a nerve. And sometimes they push down fences trying to scratch the ring out. I have no permanent fences on my farm. Gilts are easy to keep in. They don't go dragging all over the fences and breaking them down like an old sow would." Doak has low wire net fences a man can easily step over, and has little or no trouble with his gilts. "Now and then," he said, "a boar will walk right over one of these fences, as if it wasn't there. But not the gilts. They don't want to wander."

Flexibility: "I'm not committed more than four months ahead," said Cy Doak. "If I got sick, or the hog market went all to pot, I could get out right quick, selling off the fatteners, and the gilts unbred. But the market doesn't worry me a lot. I figure I can still break even with $11 hogs, but I won't make a dime."

Crushing: "A gilt is a lot more nimble than an old sow," said Doak, "and we don't have any trouble with her lying on her pigs. She's not as clumsy, and she gets up and down a lot faster. We put three litters together, and there's plenty of room for the pigs to get out of the way. We don't need crates, or pens, or rails—and we don't watch the gilts much, either. So we save labor and equipment."

The Tax Angle: "Remember, you sell the gilt at 14 months. The money she brings is eligible without any question for the lower rate of capital gains tax. The gilt goes on full feed for ten days after weaning and sells at 400 to 450 pounds. And I often get a little bit better than the sow price for a one-litter gilt. Last fall it was 18½ cents. Now suppose that gilt was 440 pounds—she'd bring $81.50. I figure she cost me about $77—she's worth $42 when I breed her (200 pounds at 21 cents), though she may not have cost that, and I know it costs $35 to feed that gilt from breeding to slaughter. That's with feed at $55 a ton. So she cost $77, give or take a buck, and she sells for $81.50. Now I only pay tax on half of the difference—but I've charged every bit of expense to raise a litter of pigs. They haven't cost me anything," said Doak. "Well, nothing but a bit of creep feed, and the profit in the gilt covers that. Now, that makes sense, doesn't it?"

Gilt Sales: "I sell the gilts I don't keep for breeding. There's a good demand for them. They go at the packers' price in Cincinnati for a 220-pound hog—whether they weigh that or not." Doak smiled. "I won't save hogs for anybody, so it's a drag-out whether they buy 'em small and get first pick, or let me feed 'em awhile, and risk missing their choice. They can have any but the ones I keep to breed." Doak likes the system, and so do the others. "This way," he said, "I make the price the gilts will sell for anyway, and I don't make any enemies. I know it's a pretty fair deal, or buyers wouldn't keep coming back. My own breeding gilts go out for a toughening-up period before I turn the boar in. If they're going

Dr. Wallis answers your questions about...

vitamin D nutrition

q: Is there a new recommendation for the amount of vitamin D to be fed for preventing milk fever?

a: Yes, on the basis of recent work, the Ohio Agricultural Experiment Station now recommends 20,000,000 units of vitamin D_3 per day for five to seven days before freshening. This is two-thirds of the previous recommendation. Now milk fever prevention costs even less than before.

q: Can I depend upon good sun-cured hay to supply enough vitamin D for my livestock?

a: Definitely not. Contrary to what is often assumed, the amount of sunshine received in curing does not provide a reliable basis for judging vitamin D content. Some sun-cured hay is even lower in vitamin D than artificially dried hay.

q: I have a herd of good producing dairy cows. How much vitamin D do they need?

a: Experimental evidence on vitamin D requirements is limited to work for less than a year on five or six cows in moderate to low milk production. Obviously, this is not enough to give reliable information for high-level performance on a long time basis. Based on accumulating evidence on vitamin D needs, more feed manufacturers are increasing fortification of complete dairy rations to 6,000 - 8,000 units of vitamin D per pound. As an example, when fed at the rate of 10 pounds per day, a cow would get 60,000 - 80,000 units of vitamin D daily.

q: My brood sows are getting a lot of sun-cured alfalfa hay. Will that take care of their vitamin D needs?

a: Not necessarily. One-third of twelve sun-cured alfalfa hay samples included in a recent report would have contributed less than 60 units per pound of complete brood sow ration when used at a level of 25% and the lowest one only 20 units. The highest one of the twelve samples would have contributed far less than the 500 units per pound recommended by many nutrition authorities. (Send for free reprint "The Vitamin D Content of Roughages").

q: Will it do any good to put vitamin D into beef cattle rations?

a: Very little controlled research has been done, but benefits from supplemental vitamin D have been observed in college and commercial beef herds for growing, fattening, and breeding stock. Realizing that unrecognized losses may frequently occur, many feed manufacturers fortify beef cattle rations with vitamin D.

G. C. Wallis

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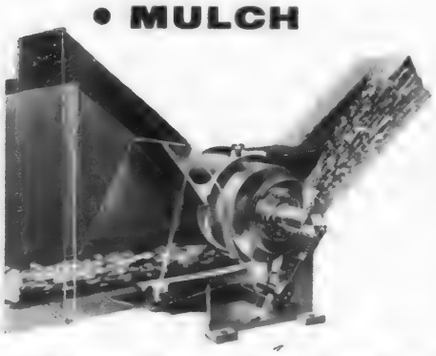

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to show any weaknesses I want to find it there."

Against the System

"Drawbacks?" Doak grinned. "I'll tell you one—it's not the best thing for every farmer's program. For one thing you have to buy a boar every year. You can't use the old one on his daughters. But although I have to buy two boars every year, I won't lose very much. They'll still be young boars when I'm through with them so I sell them for breeding. I demand the highest quality boars with quality carcass and production records. Feed conversion in the pigs, I look to get from the boar. And I'm more interested in his health record than anything else. I'm against buying hogs. I think you spread disease. But I have to buy boars, so I buy good ones.

"I don't think," said Cy Doak, summing up, "there's a quicker way than mine to improve a herd. And I'm positive it is more profitable than old sows. If you or anyone else can find something wrong—or a better way, show me, and I'll do it."

Rhinitis and the Gilt

That is the end of the story for Cy Doak, but there is a place where you can't work the one-litter gilt. Or so one man at least feels. That is where you have rhinitis and virus pneumonia. Why? Because virus pneumonia is more prevalent in gilts than sows, and the pigs pick it up from them. Thus pigs out of first litter gilts suffer far worse than the second litter pigs out of the same sow. And when the two diseases hit together, they hit hard. Doak's answer is simple. "I haven't got rhinitis, but I'm watching for it and any other disease. The first thing they do when they slaughter the test pigs is to cut that nose off and look for any disfiguration. If I get it, I'll fight it. I'll sell off all my stock, clean up my place thoroughly for 90 days and start off again with clean animals. No sense in compromising with rhinitis or pneumonia. But until I do, I'm not going to drop a system like mine. It has too many good points."

There is a man who was an avid supporter of one-litter gilts but was forced to change. John Gaye is not his name, but we shall call him that, and he is a hog breeder somewhere in the Corn Belt. Gaye still carries a list in his diary of the reasons a gilt should be sold after her first litter. He believes selling the gilt as well as the litter adds the value of two extra pigs—one in the extra weight of the 400-pound gilt and one in the money saved on the capital gains tax. Also, he says, there is less investment in the breeding herd. But Gaye's last reason is pathetic in light of his experience. It reads, "Sell off disease, select young, healthy gilts."

Yet Gaye's experience shows pigs from a gilt's first litter are far more susceptible to rhinitis and virus pneumonia. It was pitch dark at his farm last December, and Gaye had just come from watering his hogs. "Listen," he said, and raised a finger. A

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hog sneezed. "That's the sign," he said, "that and coughing. That's rhinitis and virus pneumonia.

"Whenever we have gilts, we have trouble. You'd look at them —so would a vet—and say they were healthy. With virus pneumonia, as a gilt becomes older she doesn't pass it on near as readily to her pigs. Particularly after the first litter. In the second litter she's 18 months old and if she does pass it on, it isn't in a virulent form. But in the pigs from a gilt, it's active. Boy, it just knocks your pigs right down."

Rhinitis is a condition as yet without a cure. The cause is uncertain, and rhinitis in many cases can only be detected by slaughter. But the results are sometimes hideous. The nostrils are swollen and don't grow. If one nostril is affected, the snout curls round, and the nose faces sharply to one side. If both nostrils are diseased, the whole nose is shortened, and the hog has an exaggerated "Berkshire" nose effect. The hog coughs, sneezes, and the nose exudes a filthy, cheese-like mess. It's not pretty.

Virus pneumonia is a disease of the lung. The signs, externally, are often wasty hog. An animal with long legs, thin hams, and a belly too far from the floor is suspect. A slender, willowy shape is all right in a chorus line, but not in a hog lot. Sometimes a hog with pneumonia is thought to be meat type. They lack fat, but it's an expensive way to get meaty bacon.

Gaye continued, "Whenever we have gilts, we have trouble—and there's not much you can do about it. We use sulfa—in the water, or if they are bad we inject it. Soluble Terramycin is pretty expensive, but it's a top-notch medicine. I don't think anything will knock rhinitis out, but the greatest help is vigorous growth, and a good feed, with antibiotics, like Terramycin, to keep 'em growing fast. Virus pneumonia is the same. It moves around with the hog. We've moved what we thought were clean sows where there hadn't been pigs for 40 years, but we still had it.

"There's another factor with pneumonia," said Gaye, "and that's worms. A wormy bunch of pigs sets the pneumonia on fire and that sets the rhinitis on fire and then you're out of business. We've found it pays to keep the worms under control and we've been using hygromycin."

A veterinarian's comment on this summary by John Gaye was, "If I were making a technical presentation, I would be a little less direct about drawing the relationship between pneumonia, rhinitis, and worms. But in the farmer's language, it is fine."

"I had my first trouble in 1955—with first litter gilts. I said I wouldn't spend any money on the pigs, until they kept dying off like flies," Gaye said. "I sold sows to five neighbors—all had second litters, and none of them had any trouble with pneumonia. There seems to be some sort of immunity after the first litter. The rhinitis doesn't bother you much if you have no pneumonia—and you feed high antibiotic levels.

"Now we keep our sows as long as we can. But every now and then we have to replace them with gilts." Gaye thought back. ". . . Last spring we farrowed all gilts. In the fall we farrowed the same sows with their second litters. The spring pigs were riddled with rhinitis and virus pneumonia, in the fall pigs we had no trouble at all. In fact, the spring pigs were such poor doers many went to the packer at the same time as the healthy fall litters.

"Remember," Gaye said, "I was a one-litter man myself. Now I'm going to keep these sows just as long as I dare. And I'm going to weed out every sow that sneezes or wheezes, to see if I can eliminate the ones with low resistance." He hesitated, then said, "I'll tell you in three or four years if I've been successful."

Research supports Gaye's point. In 1955 two researchers, Macpherson and Shanks, found 6 per cent virus pneumonia in 670 old sows, and 55 per cent in 1,000 gilts. They did not show transference to pigs, it is true, but with more disease around, no doubt there is more chance of its spreading.

So there it is. One-litter gilts, a fast-growing system, excellent for herd improvement, and with a minimum investment. Old sows are hard to handle, hard to fence, and need larger housing area than gilts. Herbert Doak and John Gaye agree gilts have definite advantages on many farms.

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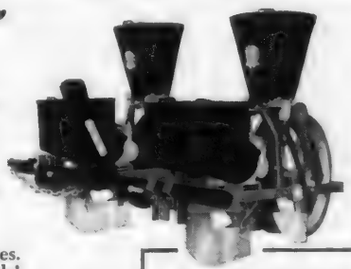

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HE SCARED GRANDFATHER

(*Continued from page* 76)

"This would have been real courage," the story concludes. "You must have this fearless spirit or you will get into trouble, and will be and ought to be disliked by all."

Many of the lessons, especially in the first three Readers, were used by the author as instruments for teaching the wild frontier youth that crime doesn't pay, that vengeance is the Lord's only, and that only the good become rich and happy.

McGuffey's message to mankind was wrapped up in a primer, six readers, and a spelling book. The primer and the first three readers were written at Miami University, where McGuffey, fresh out of a Paris, Kentucky, schoolroom, had gone as professor of ancient languages in 1826.

Robert Hamilton Bishop, president of Miami University, which was then little more than twenty-five years old, hired William McGuffey from a backwoods school teaching job in Kentucky, where he was holding classes in a made-over smokehouse. He rode into Oxford with all his possessions in his saddlebags—a few homespun garments and his precious books in Latin, Hebrew and Greek, and texts of books he had borrowed and hand copied. Behind him rode his ten-year-old brother, Alexander, whose up-bringing and education William had taken over following the illness of their mother, who died in 1829. Alexander was to become a prominent Cincinnati lawyer. He also had an important part in the development of the Readers, compiling the Speller and the Fifth Reader himself, and contributing to others.

William Holmes McGuffey, or M'Guffey as it was sometimes spelled, was of Scottish ancestry. His grandfather, an uncompromising Calvinist, was born in Scotland, emigrated to Pennsylvania, and fought in the Revolution. William's father, Alexander, known as Sandy the Scout, achieved some fame as a spy and scout in the Indian Wars immediately following the Revolution. Sandy's close friend and scouting companion was Duncan MacArthur, distant kin of General Douglas MacArthur and later governor of Ohio. Sandy and Duncan were with General St. Clair in his ill-fated campaign against the Indians which ended in his defeat and rout. Later they scouted for Mad Anthony Wayne, who defeated the Indians at the battle of Fallen Timbers in 1794. Later Sandy married and bought a farm in western Pennsylvania, near his father's home. William Holmes was born here in 1800.

When he was two years old the family moved to the Ohio county, following the example of Duncan MacArthur, who had bought land near Chillicothe, Ohio. The McGuffeys bought a farm near Youngstown and it was here that William Holmes grew up.

For the most part, he was self-taught. His mother tutored him and in his late teens he attended a school in Youngstown conducted by a Presbyterian minister, the Rev. Mr. Wicks. After failing to pass the Yale entrance examinations, he entered Washington College, near his father's old home in Pennsylvania. Pressed for money, he left Washington and became a roving teacher. Here he was found by President Bishop, who offered him $600 a year to teach languages and philosophy. McGuffey received his degree from Washington in absentia.

Legend has it that McGuffey had the manuscript for a school reader in his saddlebags when he rode to Oxford in 1826. Certain it is that had he been considering a new type of textbook for the pioneer schools.

The readers and spellers then in use were usually archaic and foreign to the new Western mind. Most of them were of English or New England origin, deadly dull in content and as far as the poles from reaching a common ground with the settlers' children. The best known of the lot was The New England Primer, which opened with the dour warning, "In Adam's fall, we sinned all." McGuffey envisioned a reader with lively narrative about everyday life which would stimulate and interest, as well as instruct. There would be a moral in almost every lesson, thanks to his Calvinistic turn of mind.

He knew well the state of literacy in the new Western world. There were few books and few schools, and many a substantial man signed his name with an X. McGuffey probably knew that

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Aluminum shades used in Yuma Experiment Station test.

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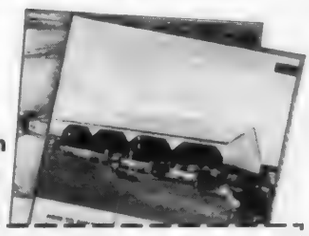

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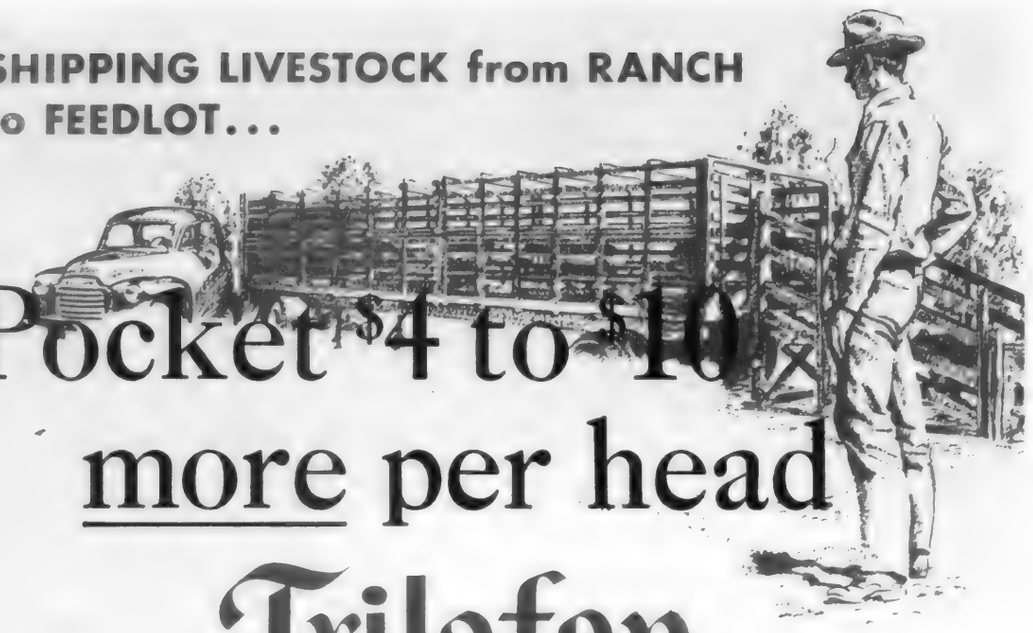

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one of the greatest men of his time, Daniel Boone, had carved on a tree in Kentucky, "I ciled a bar on this tree." Parents could study his reader with their children.

McGuffey probably had no immediate plans for publishing his reader, but, like many a great new idea, it had germinated elsewhere. Winthrop B. Smith, junior partner in the publishing firm of Truman and Smith of Cincinnati, was also working on the same idea, but with a commercial rather than an educational angle. Schoolbooks were expensive in the western country, and would have a better chance for sale than stock items of literature.

Smith took his idea to Miss Catherine Beecher, who, with her sister Harriet, had opened a school for girls in Cincinnati. Catherine's great talents were later shadowed by those of her sister, Harriet, author of Uncle Tom's Cabin, but she was a great woman in her own right. She was a leader in the feminist movement of her time and had advanced ideas on education. The Beecher home in Cincinnati was a center of literary life and culture, and William Holmes McGuffey, in nearby Oxford, was soon a member of the circle.

Catherine Beecher knew of McGuffey's plans and when Smith came to her with his project, she suggested McGuffey. McGuffey was delighted. He contracted with Smith for four readers, for which he was to receive $3,000. Later he received a small gift from the publisher, but no actual royalty. Alexander received $500 for the speller.

It is not known how great a hand Smith had in shaping the content of this first edition. As an important part of his teaching method McGuffey asked for pictures, and Smith obliged with stock items from his files. Many of these were of English origin, and the characters and scenes were distinctly out of character with the frontier. But they were pictures, achieved their purpose in no small way, and were greatly improved in time.

The First and Second Readers appeared in 1836 and were followed soon after by the Third and Fourth. Sales were slow. Truman and Smith apparently failed to work in double harness and were never quite solvent. They parted company in 1843, Smith taking the McGuffey property as his part of their meager assets.

Smith was an energetic salesman and the Readers were soon the leaders in the Midwest. He engaged Alexander McGuffey, who was practicing law in Cincinnati at that time, to write a Fifth Reader. This was at first called The Rhetorical Guide and was later expanded into the Fifth Reader.

From 1834 to 1890 seven publishers brought out McGuffey books. Smith expanded into W. B. Smith & Co. in 1853. In 1863 Sargent, Wilson & Hinkle took over the rights. They were followed by Wilson, Hinkle & Co. in 1868, Van Antwerp, Bragg & Co. in 1877, and the American Book Co. in 1890.

The last edition was printed in 1901. In

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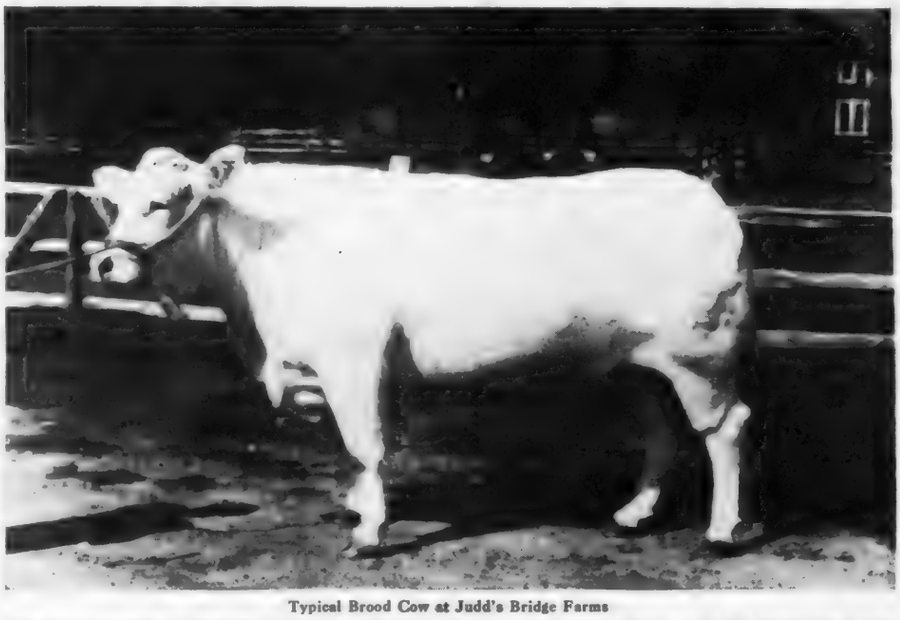

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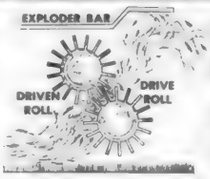

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1880 an edition called "The Alternate McGuffey Readers" was brought out in an attempt to meet a demand for more than one reader in the schools. There was nothing of McGuffey in these Readers to justify the name except an effort to duplicate their quality and purpose.

It was under Van Antwerp, Bragg & Co. that the Readers reached their peak of popularity. Constant revision had been made, partly by McGuffey, partly by his brother Alexander and others. The 1879 edition, under the editorship of Henry H. Vail, is regarded as the greatest in artistic excellence. It was during the tenure of Van Antwerp, Bragg & Co. that a group of prominent artists were commissioned. Among them was Henry F. Farny, a Cincinnatian, who was to become famous as an illustrator and Indian painter. Others were George Wharton Edwards, Mary Hallock Foote, William Hamilton Gibson, Will H. Low, Thomas Moran, Charles S. Reinhart, James Carter Beard, a brother of Daniel C. Beard of Boy Scout fame, and Howard Pyle. Pyle's first published work appeared in a McGuffey Reader.

In the heyday of the Readers, between 1870 and 1890, 60,000,000 copies were sold. They were the basic schoolbooks in thirty-seven states, exclusive in many. From 1836 to 1901 there were more than 122,000,000 copies printed.

They went west in the covered wagons, crossed the Pacific and were translated for Japanese schools. Spanish translations were used in the schools of Puerto Rico and Spanish America.

Yellowed, dog-eared, patched, they were handed down in the family, and on to the next generation and the next. With Ray's Arithmetics they were often the only textbooks in the log schoolhouses of the pioneer, and in the middle years, when the little red schoolhouses came along, they were its bulwark and foundation stone.

What was the secret of the Reader's success? For one thing, they were as American as the one-room schoolhouse. The scenes and characters which McGuffey projected into the schoolroom were familiar to all—a world of farmyards and fields, streams and hills, peopled by a new species, the American, fast evolving from Englishmen and Irishmen and Germans. Known intimately to all in this new western world were the horse and the cow, the duck, the dog and the cat. McGuffey wrote for a farming population, for in those days most people were either farmers, or farmers once removed. The work of the farmer, his animals, his simple pleasures, his problems of adjusting himself to a new and strange society—these supplied much of the subject matter for the first three Readers.

McGuffey used the idiom of the people; his simile and metaphor were taken from everyday life. He was a purist in his use of language and as articulate as Lincoln. And when the Primer and the first and second Readers were conquered and the learner no longer dreaded the printed page, he

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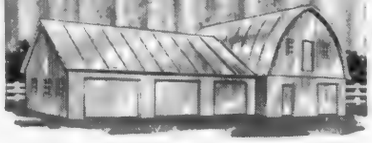

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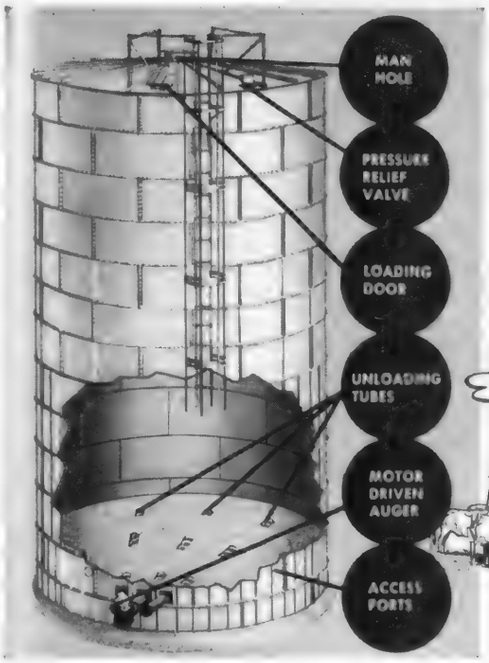

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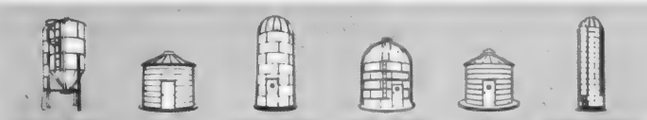
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gave him a heavier, but no less appetizing, diet. In the upper Readers, third to sixth, he introduced a discriminating variety of poetry, oratory and essays, so well tuned to rural minds they were read from the pulpit and around the fireside.

The McGuffey Readers gave the pioneer his first dash of culture, his first exposure to learning. Here was the flambuoyant oratory that had stirred revolutionary America, Patrick Henry's immortal "Give me liberty or give me death" speech; here were the home-spun rhymes of Longfellow—"The Village Blacksmith" and "Paul Revere's Ride"; the thoughtful, mystical "To a Waterfowl" of Bryant; Hamlet's soliloquy; Chief Logan's reply to Dunmore.

McGuffey's reputation, however, is anchored to a far greater concept than the catholic literary selections in the upper Readers. His method of teaching reading and spelling was revolutionary in its time. Under the traditional method the young pupil was taught spelling—months and months on end—before he was permitted to read. McGuffey plunked him right down to reading his first day of school. "A stands for Ant" was his introduction to education.

McGuffey also introduced illustration as a device to teach reading by association.

Each lesson was a drama, complete with suspense and almost invariably with a happy ending. McGuffey's young characters were always getting into trouble, or were faced with problems, or were the victims of unsympathetic grown-ups. But good always triumphed, and virtue was always rewarded. He was not mawkish; his greatness lay in his ability to teach morality in a simple, friendly and dignified way.

McGuffey was one of the most celebrated teachers of his time, but he was an even greater moralist, a reputation he apparently did not seek. He was never quite sure whether he was a teacher or a preacher. Moralizing came naturally to him. He just couldn't bring himself to write so many good words solely in teaching to read—the same words would point a moral, so a moral he pointed.

Although he spoke from many pulpits (he was ordained a minister in 1829) McGuffey rarely invoked the dreaded tools of his contemporaries, hell's fire and brimstone, to frighten the pioneer bad boy into being good. While the virtues he sought to inject into the pliable youth were mostly Biblical, God was not pictured as a stern avenger of the wrongdoer. Rather, McGuffey went right down to the seat of a boy's pants to make a good citizen out of him. In "True Courage," the backwoods delinquent who threw a snowball at the schoolhouse door was not promised punishment in the hereafter. Not at all—the schoolmaster emerged, birch rod in hand. McGuffey knew boys—God was unseen, the hereafter was a long time away—the schoolmaster was flesh, all too solid flesh.

The virtues which McGuffey sought to cultivate in the young reader ran the gamut from abstinence to zeal. Bravery, honesty,

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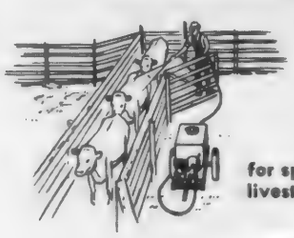

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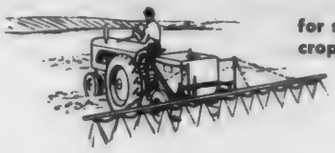

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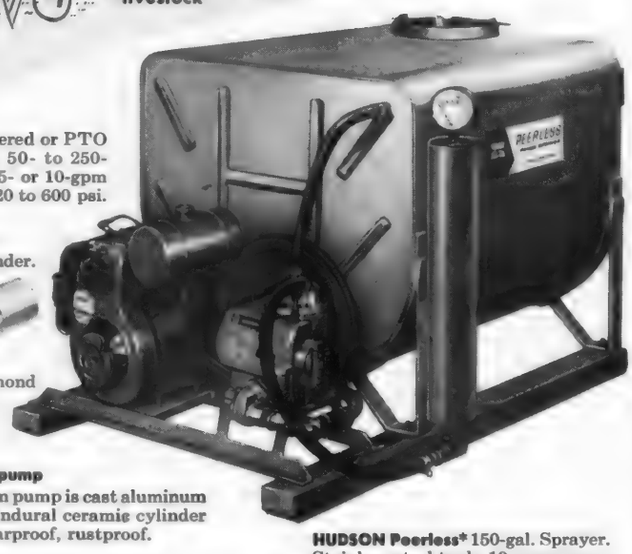

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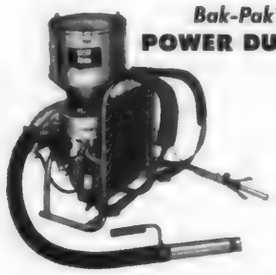

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truthfulness, fear of God, parental obedience, pity for the unfortunate, kindness, generosity, were hammered in, lesson after lesson.

While patriotism was an important theme in the Readers, by intent or happy coincidence the explosive subject of abolition was avoided. McGuffey knew the issues, and as a minister and a Northener one cannot doubt where his sympathies lay. He had been a teacher in Kentucky, where slavery was a household subject, and he had been a member of the Beecher circle, which was widely known for its championship of abolition. He could not have been admitted to that circle, and certainly Catherine Beecher would not have recommended him to Winthrop B. Smith had his views on abolition run counter with their views. It may have been that Smith, looking forward to a Southern market, had a hand in keeping this delicate subject out of the Readers. There is no record of any public expression of opinion on McGuffey's part of his stand on abolition. He made many speeches, appeared in numerous pulpits, but, unlike most of his colleagues in the pulpit, he did not "thunder against slavery."

This restraint bore fruit in his later years when he went to the University of Virginia as professor of philosophy. He taught there through the Civil War, and, according to his biographer, Dr. Harvey C. Minnich, "Though a Northerner, no hint of disapproval of his views has been found. He was much beloved by the Virginians and was especially kind to the Negroes and the poor."

McGuffey went beyond the Bible to the realities of his time to teach the value of thrift and the inconvenience of poverty. The Scots in his ancestry gave him a healthy respect for this world's goods and he more than hinted that being the richest man in the county had its good points. He was fully aware of the New American cult of success and was careful to point out that being a good boy was not only spiritually rewarding, but goodness also brought success and riches. *"Grateful Julian,"* a Second Reader story, closes with this fine sentiment, "The rich man sent Julian to school, that he might have a good education. He grew up an intelligent and industrious lad. Everything prospered with him; and when other parents wished to teach their children to be grateful, they used to tell them the story of Julian and his rabbit."

McGuffey fell short of practicing what he preached, however, and never became wealthy. His books made several millionaires among publishers in their time, but very little of the millions filtered into McGuffey's pockets. He received $3,000 for his first three Readers from Truman and Smith. After paying him a pittance for one of his later editions, the publisher had an annual attack of conscience, and for many years sent him a barrel of hams for Christmas. He did not seem unhappy about his small returns, for big money from royalties was not common in the textbook field.

Although McGuffey's reputation today rests upon his Readers, in his lifetime he achieved the stature of a giant in education. After ten years at Miami as a teacher he served three years, 1836-39, as president of Cincinnati College, and the four years following as president of Ohio University. He was not happy, however, as an administrator and in 1843, when Ohio University lacked funds, he went back into the classroom at old Woodward College in Cincinnati. In 1845 he went to the University of Virginia as professor of philosophy and taught there until his death in 1873.

No one could ever forget McGuffey's face—it was so prodigiously homely. His features seemed to have been picked at random and thrown together around a particularly unhandsome nose. He wore a top hat to classes to the day of his death and stuck to knee britches long after they were found only in museums.

After McGuffey's death in 1873, the Readers went on through a number of editions. The last regular edition came out in 1901, but popularity was waning, and by 1920 the time of the Readers was past. A reprint of the 1879 edition is still in print and one occasionally hears of its use. The revised Readers, known as the Golden Rule Series, have been adopted by Texas.

When Miami University celebrates the 150th year of its founding this year at Oxford, McGuffey's old home on the campus will be the mecca for a thinning group who had the rare privilege of learning the lessons of life from the Peerless Pioneer Readers.

FARMING WITH PLASTICS

(*Continued from page* 95)

by 12-foot frame 8 feet high at the gable. The plastic is applied double, inside and outside the frame, to provide a dead air space for maximum insulation. It is first stretched along the bottom of the frame, the first strip buried in the soil. The second strip is lapped over the first, four to six inches. Ordinary roofing nails with metal washers or a stapling machine are used to secure the plastic to the frame on the inside, and the whole is secured with lathe strips on the outside. Wind resistance is high. The University of Kentucky reports that there has been no wind damage to a greenhouse covered with 2 mil polyethylene in four years. Mylar in the 5 mil thickness has withstood 70 m.p.h. winds.

Polyethylene film is also being used to insulate glass greenhouses.

Field Greenhouses and Row Covers

The field greenhouse, also pioneered at the University of Kentucky, is a relatively new development in the vegetable-growing field. They are semi-permanent and usually made from tobacco or tomato stakes or similar rough lumber. The popular size is 10 feet wide, to cover two rows of crop, and about 5 feet high. Either single or double layer coverings can be used. Many field greenhouses are not heated. In addition to the protection of the walls, strips of 1 mil plastic are sometimes placed directly over the plant beds. This double insulation will keep lettuce and similar cold-resistant crops growing without heat even with freezing-and-below temperatures outside.

A variation of the row greenhouse on a smaller scale is the row crop cover, which makes it possible to install "cold frames" by the acre instead of by the square foot as with glass. Strips of clear 2 mil polyethylene film, 4½ feet wide, are supported by wire wickets which form a frame 2 feet wide by 1½ feet high over the crop row. The edges of the film are buried in the soil. Slits are cut at the top to permit inspection, ventilation and harvesting. When extra frost protection is needed a second strip of film is stretched over the first to provide a dead-air insulation space. The row cover permits one or two months earlier planting, the shock of replanting such crops as tomatoes is eliminated and growth is speeded.

While steam heat is the most satisfactory for plastic greenhouses, it is expensive to install and operate. Natural gas, bottled gas, and fuel oil are being widely used for hot-air heating. The heat is conducted through black plastic tubing which, being flexible, can be moved easily among the plants. The tubing need not be heavy; 3 mil is satisfactory.

The use of inflated plastic bags for greenhouses and other farm structures is still in the experimental stages. These bags, of lightweight plastic, are air-tight and are inflated by a small fan which maintains pressure at about five inches of water, sufficient to hold the bag in shape. They are being used for storage of grain and protection against the weather for all sorts of material.

A DuPont spokesman says of the future possibilities of these structures, "We believe the air-supported plastic bag can be developed at a reasonable cost to cover whole fields and even whole farms. This is a long way toward establishing a man-made climate."

Livestock Shelters

Bakelite has experimented with a Visking black polyethylene with a white coating. This experimental 10 mil film, when used with the white side outside, keeps temperatures between eight and ten degrees cooler than conventional wooden livestock shelters. The frame can be pole-type made from rough lumber. When the black side is turned outside, the temperatures are correspondingly higher inside. This type of structure will last three or four years.

In California, a temporary type shelter for lambs, made from rough lumber and clear polyethylene, is giving satisfaction. One such shelter, 20 feet by 96 feet, was covered with 2400 square feet of clear film and erected at a cost of 10 cents per square foot. An 8 mil film was used for the roof and windward wall, lighter film for the other three walls. Conventional material would have cost 75 cents per square foot. This stood up well for the three months

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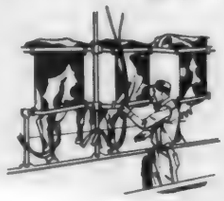
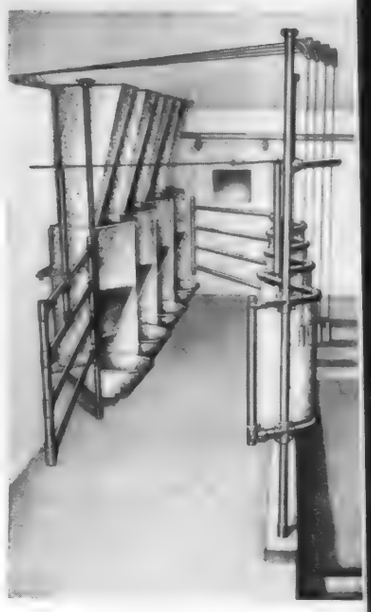
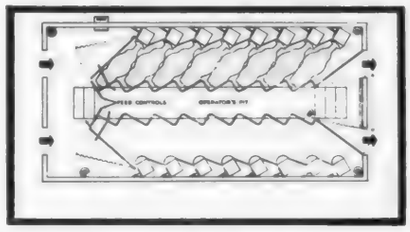
HUDSON gives you Herringbone type Stalls







Diagrammatic view shows how cows are angle-parked, and locates feed controls and operator's pit. Arrows indicate where cows enter and leave.

One man can milk up to 60 cows per hour in a Hudson Herringbone-type stall system. He has up to 16 milking positions in about 25 feet. With cows touching each other, they are quieter, let down milk faster. The operator spends less time waiting, more time milking, because the cows are handled in large groups. Feed and gate controls are convenient in the pit. And Hudson offers features that mean long service life, easy operation. Investigate.

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2 TYPES: NEW Hercules* CHAIN, Kleen-Ezy® BELT

HUDSON Automatic Barn Gutter Cleaners

For the highest standard of performance and lowest per-year cost, HUDSON gutter cleaners should be your choice. The Hercules has an all-galvanized steel elevator, over-size special steel chain, angle-iron flights. The Kleen-Ezy has nothing but a flat belt in the gutter, wipes as it cleans, outlasts all other types. Ask for specifications for your barn...now.

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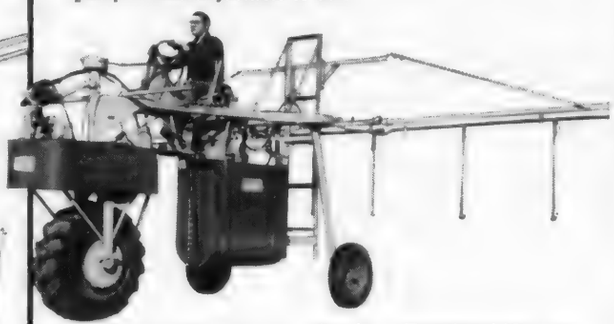

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of the lambing season in spite of high winds and a 19-inch rainfall. It was later used for hay and machinery storage.

Building material made from fiber glass and other types of rigid plastic is being used sparingly for permanent farm buildings, mostly on an experimental basis. The most familiar of these materials is the corrugated fiber glass panels used for roofing and siding where admission of light is desired.

The Alcoa Company of Pittsburgh has announced a "plastic sandwich," two aluminum panels with a semi-rigid foamed plastic fused between. The sandwich forms a complete wall section and is easily worked and shaped.

Pond Liners and Reservoirs

One of the blessings of a farm pond is not that you can dig it and forget it. The water seeps out and the weeds clog it and destroy its efficiency as a source of water and habitat for fish. Liners made of plastic are solving these problems and adding a few bonus benefits—one is that big fish have less trouble catching little fish for food.

An opaque vinyl, up to 8 mil in thickness, and black polyethylene, up to 6 mil in thickness, are the most popular for pond liners. A clear polyethylene has been used, and lighter weights. The clear film does not entirely inhibit weed growth and the light weights are easily punctured by stones and weed stems.

The vinyl, being heavier than water, sinks to the bottom and lies flat. The polyethylene is lighter than water, and must be weighted. A plastic liner is unaffected by prolonged exposure to water, and inert to the action of most chemicals. The dark color blends unobtrusively into the pond landscape. Pieces smaller than pond size can be moved about to kill aquatic weeds. The liner imparts no taste or harmful qualities to the water and will lessen sediment and discoloration.

Pond liner goes to the farmer in rolls, which he bonds himself, or folded and rolled in one piece to cover a surface up to three or more acres. It is simply unfolded along one edge of the pond excavation, unrolled across the water surface, and anchored. Stone weights or soil shoveled over the edges are sufficient anchorage. The pond bottom should be scraped clear of weeds—if cut, such weeds as cat-tails might puncture the liner.

A similar type of plastic is used as irrigation ditch liners to prevent seepage and weed growth. A ditch liner need not be as heavy as a pond liner. It comes in long rolls in any desired width. Here again the opaque is recommended. In porous and semi-porous soils a ditch liner can save its cost many times over in one season. The price for 6 mil polyethylene for both pond liners and ditch liners ranges between 2 and 3 cents per square foot.

A temporary or semi-permanent reservoir for the economical storage of liquids can be made with a pond liner. This type

The HARROWEEDER . . . for bigger yields!

THE FARMHAND-MELROE HARROWEEDER is increasing yields of wheat, corn, soybeans, sugar beets and cotton and cutting costs at the same time. It gives you faster, easier, more effective soil preparation and weeding. The secret is the unique "vibracoil" action of the patented Harroweeder teeth. This action settles the soil, works out air pockets to preserve moisture. Soil "warms up" earlier. Only the Harroweeder offers this effective "vibracoil" action. See your Farmhand dealer.

THE FASTEST CULTIVATOR on the market . . . 100 to 200 acres a day, depending on the size of your Harroweeder. Actually replaces drag harrow and rotary hoe, eliminates first two cultivations with row crop cultivator. "Vibracoil" action will uproot weeds, loosen compacted dirt and aerate the soil. Even "in the row" weeds are kicked out, without damage to crops. Available in 15 to 55-ft. widths, folds up for easy transport. Practically no repair or maintenance. Ask about a demonstration.

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of liquid storage, now being used in the oil fields, may have an application on the farm when temporary storage of water, molasses, or other liquid is desired. This type of reservoir is merely the back-yard plastic swimming pool gone commercial. Polyethylene as well as vinyl is being used for these reservoirs.

Silos

As plastics were perfected and the cost came down, sheet plastic was used as trench silo covers in a wide variety of weights, sizes, and materials. Then, as a refinement of this method of preserving silage, came the above-ground silo, completely covered and sealed in by a sheet of plastic.

This method of putting up silage has become standardized and has brought a great economic benefit for farmers who can put up excess forage during heavy crop periods at small expense. There are a wide variety of weights and types available, but black polyethylene, of 6 to 8 mil weights, is recommended. The lighter weights are not usually reusable. A 6 mil sheet, 150 feet x 32 feet, with a capacity of 150 tons, costs about $140 and can be reused.

The newest wrinkle in the use of plastic as a portable silage preserver is a tube of vinyl film which can be set up on a wood or concrete platform at any convenient spot on the farm. The tube is rolled up like a stocking and placed in a circle on the platform. A foot or so from the end of the tube is pulled toward the center of the

Faster Crop Drying with NO wet pockets

Dries 200 bushels of shelled corn from 25% to 15% moisture content in ONE HOUR

AUTOMATIC RECIRCULATION

eliminates wet pockets! Here's how: easy-to-load 9 ft. DRAG AUGER (1) takes grain to BOOT (2). BUCKET ELEVATOR (3) Lifts to LEVELING AUGER (4). Open LEVELER TROUGH DOORS (5) admit grain to DRYING BINS (6) being used. Movable CANVAS CLOSURE (7) permits drying small batches without heat waste. Powered METERING ROLLS (8) provide positive metering of grain to UNLOAD AUGER (9) for either recirculation or unloading.

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Lennox "Super 600" Batch Bin offers 500,000 to 4,500,000 Btuh with huge air delivery. No hot spots. 16 gauge skin-stressed walls, inside and out. Both LP gas and oil-fired models have complete safety controls. All units factory wired and fire tested. PTO or electric drive 3-phase current.

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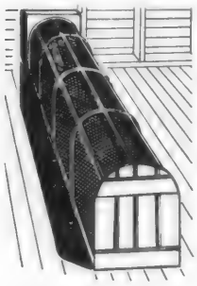
MOW-CURED HAY CUTS FEED COSTS



A Louden HAY DRIER SAVES UP TO $50 PER COW PER YEAR

Mow-cured hay keeps the nutritive leaves often lost with field curing. When you feed mow-cured hay, you spend less for supplements and concentrates.

Louden Hay Driers are inexpensive and easy to install. Sturdily constructed. They safely dry chopped, baled and long loose hay.

Mail the coupon today. Get all the facts on low cost feed-saving Louden Hay Driers. No obligation.

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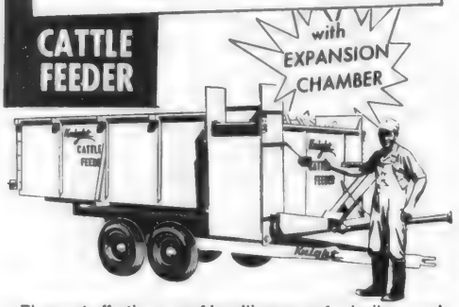
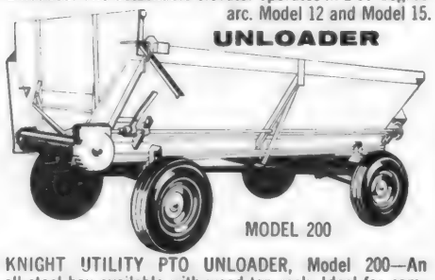
CATTLE FEEDER with EXPANSION CHAMBER



The most effective way of handling green feed, silage, and supplements. A PTO powered front end unloader with all steel construction. The "Expansion Chamber" feature is an area that is wider than the rest of the box which allows the compressed green feed to expand so that it is easily unloaded. The detachable elevator operates in a 90 degree arc. Model 12 and Model 15.

UNLOADER



MODEL 200

KNIGHT UTILITY PTO UNLOADER, Model 200—An all-steel box available with wood top rack. Ideal for combining, corn picking, silo filling, handling green feed and grain. Designed for rugged use.

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platform to provide an air-tight base. A snow fence or wire fence support is then placed around the diameter of the ring and the silage poured in. The second and following tiers are each made smaller to provide stability. The plastic is pulled up around each tier and secured. When the bag is full it is tied at the top to seal off the air.

Charles H. Ruckle, Millmont, Pennsylvania, used two silos of this type last year. Each cost him $135 and he figures that he saved $150 in spoilage, reducing it to 3 per cent, whereas in his conventional silo he had averaged 16 per cent. "I filled my silos a little at a time, as the crop came off," Ruckle says. "After each partial filling I'd tie up the bag; had little or no spoilage."

As each silo was emptied, the vinyl was folded and stored. There is no deterioration in storage and with normal care the plastic will last five or more seasons. Ruckle's silos are 20 feet in diameter and each holds 80 tons of silage.

These tubes are ideal for the storage of perishables such as grain, feed, fertilizer, cement and other material which must be kept air and moisture tight.

Very much the same idea is used by the Visking company in a bin liner for the storage of high-moisture grain. The polyethylene, air-tight bag is supported by crib walls, snow fence, or metal grain bins.

Rigid horizontal silos are being made from fiber glass and other plastic materials. These are rather expensive, but require little or no maintenance. The Marietta Concrete Corp. has recently put on the market a seal for concrete silos and old silos which need repair. This seal, made from Bakelite epoxy resin, is mixed with a hardener and applied with a trowel to the interior of the silo. It seals off the air, prevents seepage of juices, and its smooth surface promotes easy packing.

Plastic has almost entirely replaced canvas as covers for stacks, machinery, grain—any and all protection against the elements. A piece of machinery can be covered with plastic and left in the open all winter with the same protection a building would afford. Plastic is as durable as canvas and needs no annual treatment as canvas does. Black film is strongly recommended for this purpose for two reasons: longer life, and less condensation.

Pipes

Little pipes, big pipes, flexible, rigid, and semi-rigid pipes for water, acid, oil, perforated pipes, well-casing, irrigation pipes, drainage pipes, hoses and tubes, and fittings for all of them—there is scarcely a metal pipe made for which there is not now some sort of duplicate in plastic.

Plastic pipe is usually cheaper, lighter, more easily fitted and handled, and for many uses more durable and less subject to corrosion and the action of chemicals than metal pipe. The rigid plastics are, however, more likely to break under a

NEW WATER SYSTEM SELECTOR FREE!

Handy Selector gives latest tables for estimating Home and Farm Water Supply Requirements—Basic Family Water Service Charts—Farm Stock Requirements—plus illustrated section covering Barnes Blue Ribbon Water Systems for all needs.

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This Level has 12-Power Telescope and is used and endorsed by Schools, Extension Service and Individual Landowners everywhere.

Accurate, Durable and Complete for Terracing, Ditching Irrigating, Grading, Tile Draining, Running Lines, Turning Angles, etc.

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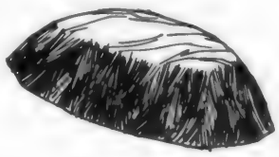
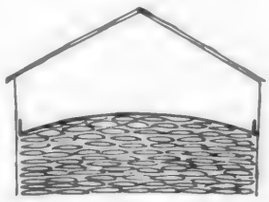
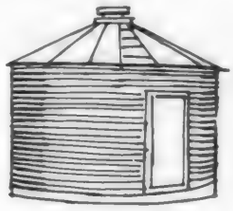


field silo



silo cap



bin liner

SPOILAGE AND NUTRIENT LOSS CUT TO ALMOST NOTHING WITH AIRTIGHT, WEATHERTIGHT FIELD SILOS OF BLACK VISQUEEN 6 FILM. Spoilage in uncovered field silos averages 30%—runs as high as 50%!

In addition, to replace nutrient losses leached out of silage in uncovered or improperly sealed field silos, you would have to buy several tons of feed—or replace the loss with high quality silage from other sources. Properly covered silos of black VISQUEEN 6 film will cut losses to under 5%—and often less.

Get the silage *out* that you put *in*. No leaching out of valuable carotenes and proteins.

Juices are saved. Nutrients locked in. No seepage losses. Palatability higher. Save time, labor. Locate anywhere for easiest, fastest feeding and filling. No more need for big investment, interest, taxes and upkeep on permanent storage.

BLACK VISQUEEN 6 FILM LINERS CONVERT ANY GRAIN BIN INTO SEALED STORAGE FOR MOIST GRAINS.

Farm tests show hogs gain up to 8 percent faster on 20 percent less supplement, when fed moist corn stored in airtight black VISQUEEN 6 film.

Now! No need to invest thousands of dollars in costly permanent silos. For just a fraction of the cost you can convert grain bins into airtight sealed storage.

SILO CAPS OF BLACK VISQUEEN FILM MAKE AIRTIGHT, WATERTIGHT SEAL. SAVE TONS OF SILAGE PER YEAR.

Eliminate the excessive fermentation and rotting that robs tons of silage per year from an uncapped tower silo. Total digestible nutrient loss runs from 10% to 50%. But—you'll have practically *no* spoilage with properly capped silos—using round silo caps made of black VISQUEEN film.

PROFITABLE TIPS ON SILAGE-MAKING AND STORAGE.

1. Cut at stage when nutrients are highest.
2. Get under cover of black VISQUEEN 6 film same day as cut.
3. Use only *black* VISQUEEN 6 film.
4. Use *seamless* widths of black VISQUEEN 6 film for field silo covers. Comes in seamless widths to 32 ft.
5. Use only *black* VISQUEEN 6 film—specially formulated for *agricultural* uses. Look for the trademark VISQUEEN printed every foot on the film for your protection against imitations.

PLASTICS DIVISION
VISKING COMPANY
first in polyethylene for the farm.

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Gentlemen:
Please send free information on silage-making with black VISQUEEN 6 film.

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Protect crops and equipment with low-cost

Durethene®

POLYETHYLENE FILM

To Protect Silage—With DURETHENE film, you get the same top-quality silage in a bunker silo as you do in an upright silo. Yet, a bunker silo costs only half as much.

To Save Silage—You can reduce surface spoilage in a bunker or trench silo by using DURETHENE film. This sturdy material provides an airtight seal and *stops* the development of oxygen-consuming bacteria.

To Cover Expensive Farm Machinery—Your farm equipment will last longer and perform more efficiently if it's protected from severe weather. By covering it with DURETHENE film, you give it weatherproof protection.

To Line Irrigation Ditches—You can reduce water seepage in your irrigation ditches by lining them with DURETHENE polyethylene film. Easy to install, DURETHENE film offers you waterproof protection against excessive water loss.

Polyethylene film has many other applications on the farm, and new uses are being discovered every day. In fact, you may have developed a new application for this material. If it's original and unusual, we'd like to hear about it. Just fill in the coupon below.

Dealer and Distributor inquiries invited

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Here's how I use polyethylene film on my farm _____

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blow or strain, more brittle, and in general not as tough or strong. Mice and rats will occasionally chew through a plastic pipe to obtain food; weight for weight, a plastic pipe will not withstand as high a pressure as metal, but some rigid plastic pipes are entirely satisfactory for pressures up to 150 pounds per square inch and higher, quite beyond anything needed on the farm.

The first use of plastic pipe on the farm was probably for water. Early in the plastic boom farmers discovered that flexible plastic pipe was the easy answer to getting water to the back forty pasture. It was cheaper than metal, there was no danger from frost, and it could be laid by plowing out a trench.

Irrigation

The first use of plastic pipe in irrigation was to replace rubber for sprinkler leads. One rarely sees rubber now in citrus grove and market gardening irrigation where plastic is used to connect main line permanent water mains to portable sprinkler systems. It is tougher than rubber, not subject to deterioration as rubber is, and generally cheaper.

In the last five years larger sizes of both flexible, semi-rigid, and rigid plastic pipe for irrigation has been challenging the lightweight metal tubing. Rigid pipe, up to six and eight inches in diameter, is being used for sprinkler irrigation. Connections and fittings are also made of plastic. It is easily connected and sealed by pressure or fittings.

It is, however, a substitute for ditches in surface irrigation that plastic offers economy, the saving of labor, and ease of operation. This "portable ditch" is a flexible low-pressure pipe or tube made in two types, transmission and distribution. The transmission pipe is used to transport water to crops as far as a mile away from the source. The distribution lengths have small outlet tubes bonded to the main tube at standard intervals to fit various crop rows. The pipe can be rolled flat and two men can carry and distribute 116 pounds, or 200 feet at a time.

The manufacturer guarantees this pipe three years, but says a farmer should get as much as 10 years with normal care. The great advantages over open ditches is that it is extremely maneuverable, will follow the contour to different levels, and eliminate all losses by seepage and evaporation.

A similar tube, but made of butyl, in use in the West and South, is made by the Carlisle Corp. of Pennsylvania. It comes reinforced with nylon for higher pressures, and butyl only for level ground transportation. It is highly portable—a 50-foot length of the 10-inch size weighs 53 pounds.

Pipes and Pipe Fittings

Pipes and pipe fittings of every size and shape, for every conceivable use, are being made by numerous manufacturers. Some of the specialties are a double-duct pipe or separately extruded joined pipes for jet well installations, and a pipe with a built-in cable reinforcement, both made by Yardley; Yardley also makes a perforated pipe for waste lines and drainage. Pipes resistant to strong acids and alkalis are in use in the liquid fertilizer industry as well as plastic liners for ordinary metal tanks.

In buying pipe it is well to remember that it is made from two grades of material, virgin and scrap. Virgin material has greater strength and lasting qualities than pipe made from scrap or reclaimed material. Only pipe made from virgin material can use the NSF (National Sanitation Foundation) seal. Pipe used for potables, such as water or milk, should be made from virgin material and should bear the NSF seal.

Plastics For Drainage

In addition to rigid and semi-rigid perforated plastic pipe to replace old-style ceramic tile, a number of plastic substitutes are now on the market. Among these is a vinyl plastic strip fed into the ground behind a mole plow. The plastic is fed from a flat roll and is formed into a tight inverted U, self-supported, in the channel formed by the mole. Drains of this type have been in operation two years without cave-ins, blockage, or filling in. The

cost of 8 cents a foot installed is considerable saving over the 25 to 32 cents per foot for standard tile.

A form of plastic drain very similar to the mole type is now in the experimental stage but promises well. The drain is a tubular plastic shaped underground behind a sub-soiler and is fed from a spool on the plow. The Caterpillar Company, which is developing the techniques, announces that the new tile can be installed at a 30-inch depth at the rate of 150 feet per minute. The cost is estimated at 7 to 10 cents per foot.

A porous mat to prevent soil from entering drainage tile is made by the L.O.F. Glass Fibers Company of Toledo.

Miscellaneous On-the-Farm Uses

There was a time when the most liquid a farmer had to haul around was a barrel of cider. But today he gets molasses for his cattle in bulk, he uses liquid fertilizer, and he's very likely to haul water for his family and his livestock during a dry spell. He usually ships his milk in bulk tank trucks. A tank truck is expensive and the farmer usually hires his liquid hauled, which is also expensive.

Now plastics have come to his aid. With a new plastic-lined bag he can convert any wagon or truck on his farm into a tank truck. A little more than a year ago Firestone and U. S. Rubber companies introduced giant rubber containers, similar to a big toothpaste tube, for the transportation of liquids in ordinary carriers. These bags, holding up to 5,000 gallons, have been used to haul 24 different products, including phosphoric acid, fish oil, diesel oil, and glue. A plastic liner, developed by the Visking Company of Chicago, opened the way for the safe shipment of potables, such as milk, water, molasses, vinegar, and liquid chocolate.

A 30-foot Sealdtank is 56 inches in diameter when filled and weighs 775 pounds empty. It absorbs expansion and contraction without venting and, since it collapses when being emptied, the contents do not come in contact with the open air. The life

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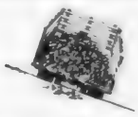
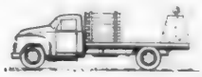


Powerful hoist arms lift body safely without twisting or swaying, even when dumping on sloping ground.



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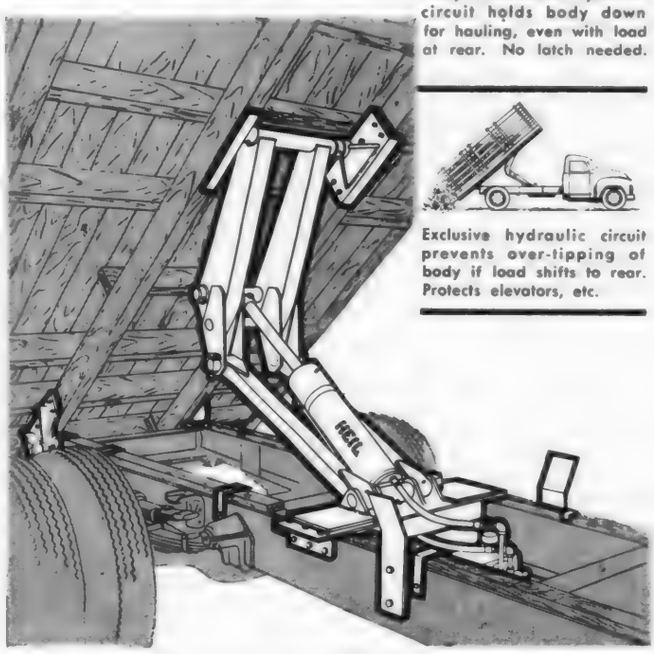

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of a bag is estimated at 8 to 10 years. Dairymen who are trying out the bags say their transportation costs will be cut 10 to 20 per cent.

The Spencer Chemical Company is bagging its ammonium nitrate fertilizer in heavy polyethylene bags. These bags have many valuable reuse applications. By a simple method of heat sealing with a blow torch, the bags can be made into tarpaulins or machinery covers, stack covers, temporary roofing, siding, and windows.

The Genetic Giant Ag-Products Co. of Lincoln, Neb., in cooperation with the Steckley Hybrid Corn Company, has developed a plastic planter plate which does not corrode, is extremely wear-resistant, and is highly accurate. What is more, it costs less than the standard metal plates.

Tubing systems for gathering maple sugar sap are saving the sugar makers of New England a good slice of the labor expense of their operation. In addition, the quality of the sap, which runs to the evaporation pan in a closed circuit, is greatly improved. From 30 to 60 trees are hooked up on one line, which can be installed well ahead of the season. The hazards of overflowing buckets, the cleaning of the buckets, and labor of collection are eliminated. The cost is less than for the buckets alone. The piping is made from Bakelite polyethylene by Skyline Industrial Sales, Titusville, Pennsylvania. Polyethylene bags have also been used in the sugar groves as a substitute for sap buckets.

A slippery-surfaced DuPont plastic, Teflon, widely used as a bearing material, has been shaped and riveted to the moldboard of a plow to shed all types of sticky soils. The plastic moldboard plating was first tried in the Hawaiian pineapple fields, where is found one of the world's gummiest soils. Plowing time was cut in half and tractors could be operated in third gear instead of second.

The material is quite expensive, $18 per square foot, and where there is some sand in the soil, erosion is rapid. In Hawaii, the coating was worn out after 250 acres were plowed. Experiments are being made with a variation of Teflon which has a longer life and is considerably cheaper.

Teflon, which is as slippery as an eel on ice, is also being used on skillets, wherein an egg can be fried without grease. It has been successfully used as a bearing which requires no oil or grease; this will be a great boon to the farmer, since his tractor and combine fitted with Teflon bearings will no longer require the time and expense of the grease chore. One manufacturer will bring out a 1960 model automobile without grease fittings.

Other uses of plastics, not used on the farm but in closely related industries, are bringing indirect benefit to farmers. For example, cabbage wrapped in polyethylene film loses less than 1 per cent of its weight even after eight weeks in storage; in unlined crates the loss would be near 15 per cent.

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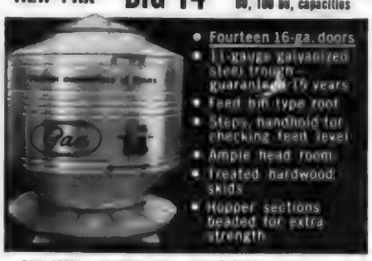
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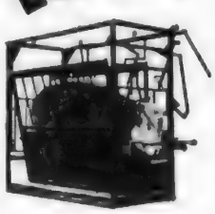
- The Chute with a Side Exit
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W-W CATTLE CHUTE COMPANY
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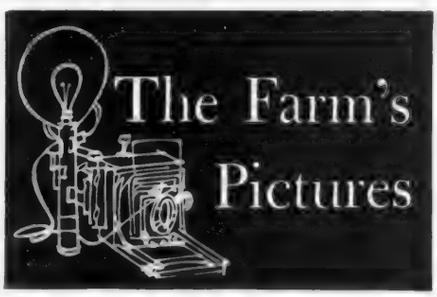

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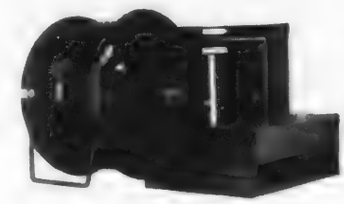

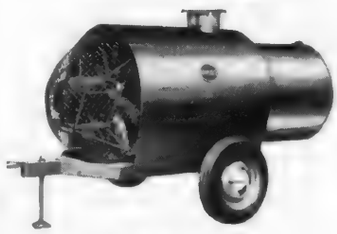

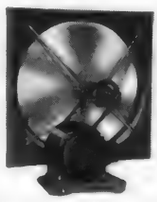

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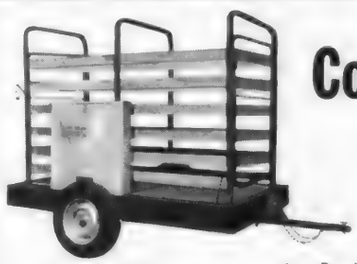

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HAIL IS HELL

(*Continued from page* 71)

kota and northeastern Wyoming. Later it hits the wheat fields of Montana and Canada. The season of maximum hail activity fits right in with the growing period of practically all the important crops."

The area with the worst hail experience in the country is the high-altitude region of the western Great Plains and the eastern slope of the Rockies.

The Hailstone Puzzle

The make-up of a hailstone is easy enough to analyze but how it got that way is a problem which is still giving the meteorologists headaches. A hailstone is a frozen raindrop or an ice crystal which has grown by the addition of successive layers of ice and snow. Any hailstone cut in half will usually reveal alternate layers of clear and cloudy ice. How these layers got that way is the puzzle.

One of the most widely held and oldest theories on hailstone formation suggests a frozen raindrop gets caught in a violent updraft in a thundercloud some 14,000 feet or more above sea level. As the frozen raindrop is carried upward it strikes supercooled water droplets (below 32 degrees F. but not frozen because of their almost molecular size) which immediately freeze and adhere to it. Then it falls in a downdraft picking up other accumulations of ice or snow on the way down, possibly drops out of the freezing region of the cloud where an additional coating of water is added, then is carried upward again through the freezing regions. This process may be repeated again and again until the stone reaches such a size that it can no longer be supported by the up-currents. At that point it falls to earth.

A rival theory is that the nucleus of the hailstone, frozen raindrop or whatever it may be, starts to fall from a great height, rushes through successive layers of supercooled droplets and snowflakes, growing as it falls and going directly to the ground without ever being subjected to the up-and-down course of the other theory.

One of the points that has been cleared up is why the hailstorm is so spotty in its attacks. A thunderstorm is made up of a number of thunderstorm cells. Each of these cells has a relatively independent life cycle. It will start out as one of those big, billowing cumulus clouds, develop into a cumulonimbus or thundercloud, spill out rain and maybe hail and dissipate itself. While one cell of a thunderstorm is in the mature stage others may just be forming, and still others dissipating. Once the hail has left a cell, that cell is finished as a hail carrier. The result is a number of locations miles apart may be pelted with hail while the areas between are untouched.

There is a relationship between tornado conditions and those which cause hail, but hail is much more prevalent than tornadoes. Some observers contend every squall

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SAVE MANPOWER THIS LOW COST WAY

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line that develops over the Great Plains during the summer carries hail. Much of it may never strike the earth or it may be precipitated in an isolated area where it does no damage.

The possibility of predictions accurately pinpointing hailstorms seems to be remote. Throughout the Great Plains and along the eastern slope of the Rockies throughout the spring and summer, almost every prediction of a thunderstorm could also carry a hail warning; but the growth and action of the storm cells makes it almost impossible to predict exactly where one of these cells will cut loose.

It has been found, however, that hail-bearing clouds show a definite pattern on radar. They have certain characteristic shapes —the hooked finger, pointing fingers, the scalloped edge, as the radar meteorologist describes them—and are much more intense on the scope than ordinary thunderstorm clouds. As the operator reduces the brilliance of the reflection, the echo of the hail clouds persists while the others tend to fade out. This has proven a real boon to radar-carrying aircraft which can spot hailstorms and dodge them.

Tracking Hail

Sandy, crew-topped Glenn Stout, head of the Meteorology Section, Illinois State Water Survey, at Champaign, Illinois, and his soft-spoken young assistant, Roy H. Blackmer, Jr., have been putting radar to work tracking hailstorms across the State of Illinois. This phase of their work is supported by the Geophysical Research Directorate of the Air Force. Every year they send out cards to farmers throughout the state requesting a detailed report of every occurrence of hail in their neighborhood. Every storm is followed on the radar scope, pictures taken of the echoes at various stages and later read against the reports of the farmers. This information, together with the reports sent them by the Crop-Hail Insurance Actuarial Association, which is footing the bill to determine the geographical distribution of hailstorms, is beginning to give a comprehensive picture of hail activity in the state.

Even all this information is not enough, Stout insists, to prove that some areas are hail-proof, or immune to hail as the local weather prophets contend.

Insurance

While hail is quite unpredictable, and it is inevitable that thousands of acres of growing crops are going to be hit every year, this does not necessarily leave the grower helpless.

Crop-hail insurance has been written in this country ever since the first policies against the hazard were offered in 1883. And with the huge capital outlays represented by growing crops today, farmers are buying coverage with almost the same urgency with which they apply fertilizer. Last year premiums paid for crop-hail insurance totaled $77.5 million up almost $8 million from the year before and $22 million more than in 1956.

Coverage can be bought on any crop of commercial value from alfalfa to watermelons. The bulk of the insurance is written on wheat, tobacco, cotton and corn, in about that order.

All crop-hail policies are written on a per acre basis and in general are what the insurance man calls a "physical percentage of damage contract," or "percentage" policy. This means each crop is insured for a certain amount per acre and losses are adjusted on a per acre basis. (In a few states a "bushel policy" is available, too, which provides insurance at a guaranteed price per bushel for the actual bushels per acre destroyed by hail.) It is the final product which is insured, not the buds, blossoms, leaves, etc., and in adjusting losses the ratio of the loss paid to the amount insured is the same as the ratio of the crop yield destroyed by hail to the total expected crop production.

Let's say, for example, a grower insured a field of wheat for $10 per acre. Subsequently, a hailstorm came along and destroyed 60 per cent of the crop. His loss would be settled for 60 per cent of $10, or $6 for each damaged acre. Had he insured for $15 per acre he would have collected $9, and so on. In no case can insurance be taken out for more than the actual value of the crop. Any company which finds itself with an application calling for an unduly high per acre value will question it or reject it.

Some Kentucky tobacco is covered for as much as $1,000 per

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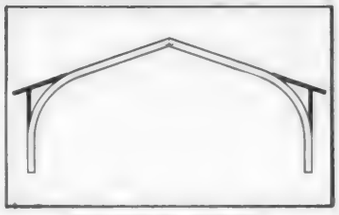

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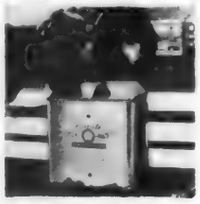

OTHER MODELS WITH HEAT OR WITHOUT HEAT

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acre and in West Texas $200 to $300 per acre on cotton is not uncommon.

Rates are adjusted at least once every three years; and these vary considerably with the location. In Illinois, for example, they run as low as $1.60 per $100 of coverage on corn in some areas. But out in the hard-hit regions of western Nebraska and eastern Colorado and Wyoming they shoot on up to $24 per $100 on wheat.

In most states there is a minimum loss provision in the policy which releases the company from liability for any loss unless the loss equals a stipulated amount, usually 5 per cent. Because of the variations of policy conditions from state to state, and even within states according to crops, etc., applicants for crop-hail insurance should contact their agents for specific information concerning local conditions.

The crop-hail policy is one type of insurance where a man cannot just call his agent and say, "Write me up some insurance, Joe." The application, stating the kind of crop, the insurance per acre, and the interest of the insured must be signed by the applicant and the precise time and date of the signing noted on the form. Then there is a 24-hour waiting period before the policy takes effect.

A loss report form goes with the policy and, again, the insured cannot report his loss simply by picking up the phone. He must complete, sign and mail the report to the policy-writing office when a loss occurs. The local agents, of course, do much of the work of filling out these loss forms as a service to their insured.

Any agent who has been in the business any length of time can cite instances of the office phone ringing as he was drawing up an application with the potential insured seated on the other side of his desk. The feminine voice on the other end of the line would ask to speak to the client. Then would come the sad news. "It's too late, Henry, the hail just tore up that wheat field."

Which brings up the question when should a man insure and for how much? To answer the second part first, in the high rate areas the growers generally try to cover their costs of production plus a little more, according to what they feel they can afford. Where the rates are lower they make the prospective value of the crop their guide. A wheat grower in western Kansas might content himself with coverage of $10 to $15 per acre at a cost of $20 per $100 of insurance, whereas a farmer in Washington might think $40 to $50 per acre well within reason since he pays only $1.50 per $100.

While most policies are written on an annual basis, three-season contracts are also written. These give a grower automatic coverage from year to year at a guaranteed rate. The amount of coverage itself can be increased or decreased as the grower desires.

Since the coverage applies for the whole season there is no reason why it should not be taken out as soon as the crop is in the ground, or as soon as the season starts, so far as tree and bush crops are concerned. A grower can apply for a nominal amount of insurance to start with and later increase his coverage if his crop prospects look better than he had anticipated. The application definitely should not be delayed after the crop has reached such size that it can suffer damage.

On corn and the basic grains the earliest coverage can take effect is when the crop is up and out of the ground. On tobacco the insurance becomes effective 15 days after the plants are set in the field. Other crops have similar, specific rules.

When an early loss occurs to a crop which can be replanted, the company's liability extends only to the cost of replanting, seed, labor, fuel and machinery expense being included in this cost. This is frequently true with soybeans and cotton, farmers having found it is better to replant them than to waste time and energy cultivating a damaged crop.

In a few states the hail policy includes wind damage when the wind accompanies the hail, and, in most states, fire coverage while the crop is in the field. In Kentucky, North Carolina and Tennessee, a "named perils policy" provides protection against fire and extended coverage on tobacco while the crop is in the barn.

Loss Adjustment

According to Melvin Peterson, genial assistant manager of the hail division of the Fireman's Fund Insurance Group, and an experienced adjuster himself, more than 95 per cent of all crop-hail losses are adjusted without any difficulties or misunderstandings. However, when differences do develop some of the biggest problems are those occurring when the farmer cannot or, for

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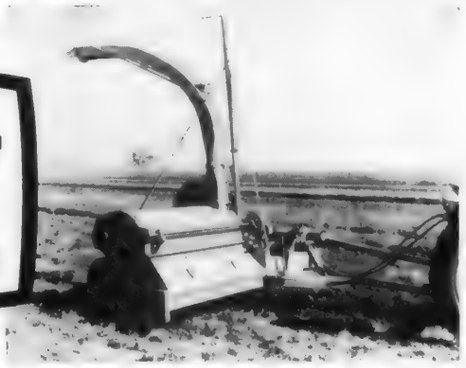

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some reason or other, will not go to the field with the adjuster to inspect the loss. Peterson says he is quite in agreement with the adjuster whose prompt reply to the farmer in such cases is always, "If you don't have time to go with us there must not be much loss, so just sign this release."

The insurance companies usually wait a week or so after a hailstorm has struck an area where policyholders report losses before they send in the adjusters. This not only gives the crops a chance to show any possible signs of recovery or deterioration, a contingency which is as advantageous to the insureds as it is to the companies, but it also gives the companies an opportunity to assemble all their losses and adjust or inspect them all on one trip.

For some crops damaged at certain stages of growth the insured and the adjuster may agree that the loss cannot be accurately determined at that time. Deferment of adjustment to a later date is common.

Good adjustment technique requires that the adjuster get a representative sampling of the damaged crop from all parts of the field. To do this the insured should insist that all fields be looked at in all parts.

In the event of a loss close to harvest time, just at wheat-combining time, for example, the best course for the grower is to harvest the crop and leave a few representative samples standing at various spots.

For the past 20 years the Hail Insurance Adjustment and Research Association has been working with experiment stations across the country to determine as accurately as possible the susceptibility of crops to hail damage at various stages of growth. Work has been done with wheat in Montana and Kansas, with corn in Iowa, with soybeans in Iowa and North Dakota and with grain sorghum in Oklahoma. Texas has worked with cotton, Purdue with tomatoes and onions, Montana with sugar beets, and so on. The result has been a compilation of figures showing exactly what the loss of the product can be expected to be from defoliation, etc., at every stage of growth. All of this has been put down on charts to which the adjuster refers as he works on the loss.

The loss on each field insured should be adjusted separately.

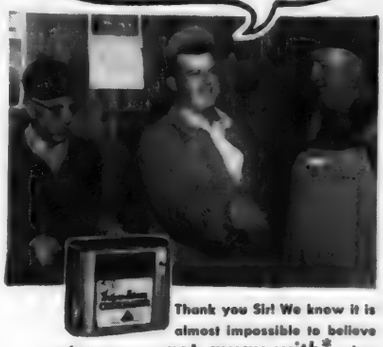
To give an idea of a loss adjustment, here is an example of 80 acres of wheat in three separate fields of 40, 25 and 15 acres each. The crop was insured at $50 per acre.

The adjuster and grower visited the fields and took four counts in each field, counting 100 stalks down the row to determine the percentage of plants broken and of heads shattered.

The four counts taken in each field were averaged and this was the per cent of loss for the field. In this case the breakdown was as follows:

Field	*% Loss*	*Insurance @ $50/acre*	*Loss Payment*
40 acres	16	$2,000	$320
25 acres	20	1,250	250
15 acres	6	750	45

Yes, I am the one who said, 'It wont work,' but try it and see



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Savings of $186.62 Per Month

"At the prices that we pay for protein supplements, this saves us $.0864 per cow per day. Multiply this by 72, the size of our herd, and you get a savings of $6.2208 per day. Multiply this by 30 and you get a savings of $186.62 per month or a total of $1,119.72 for the six months that the cows aren't on pasture. From this, you have to subtract our drying costs of $450, leaving us a net of $669.72.

"What's more, our cows actually produce more milk on mow cured hay than on pasture. In 1956, we bought some top quality field-cured hay when we ran low on mow-cured hay. Believe it or not, 2 weeks after the herd began eating this field-cured hay, production was down 400 lbs. a day. One of our best cows went from 70 to 40 lbs. per day.

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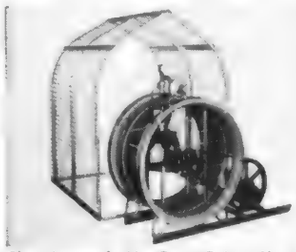

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Similar detailed adjustments are made for all other crops. In tobacco losses, the leaf is the unit of measurement. The percentage of loss is based upon the average number of leaves per plant. If there are 20 leaves per plant and one is lost by being broken, this is a 5 per cent loss. The policy provides for determination of loss from punctures to leaves by assigning a given number of punctures as equivalent to a whole leaf lost. In Kentucky and Tennessee every 50 three-quarter inch punctures are considered the equivalent of one leaf loss. Forty such punctures are counted as one leaf in the rest of the southeastern states.

Both direct and indirect loss are taken into consideration on corn, soybeans, cotton, etc., the direct loss being the damage to the plant through the destruction of the ear, pod or boll, the indirect loss being damage to the leaves.

Hail Suppression

In some foreign countries, Switzerland and Italy particularly, much work has been done in trying to suppress hail by modifying hail-producing clouds. And in this country there are professional hail suppressors who use formulas, some secret, to seed the clouds in an effort to either prevent precipitation or to cause the hail to fall in such minute particles that it would cause no damage. Despite the optimistic claims of these operators, there is little in the way of tangible fact to support the belief that there has yet been discovered any practical way of controlling hail.

Planes can spot hailstorms on their radar and dodge around them. Farmers, even with a well-developed system of forecasting, can still do nothing but sit by and watch their crops "get the hail beat out of them." But they can get the kind of insurance protection which will take the worst of the sting out of such a beating.

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Ideas for planning your milking parlor

How many stalls will you need . . . which type of stall is best for your operation . . . how much time and work can you save? The answers to these and other questions are given here.

by Joe Clay

A good, well-planned milking parlor can be a real time and work saver for dairymen. But, like every other phase of modernization, you can't jump into a milking parlor without planning. These tips on the organization of a modern, efficient parlor can save you money and help avoid problems you might have to face twice a day, 730 times a year.

Two Minutes Per Cow

To feed and milk—without moving more than a few feet? It's being done every day in modern up-to-date milking parlors. Here's how to decide how many stalls you'll need for greatest efficiency:

Three stalls allow one operator to milk 22.5 cows in an hour. Four stalls and one man can manage 30 milkings per hour. Six stalls enable a fast operator to handle 45 cows per hour. With two more stalls, plan on 60 cows per hour from two men. That's milking *and* feeding, too. The secret of this time and labor saving is simply that cows bring the milk to you. Also, with a milking parlor, the udder is elevated—at the best working level. With levers, feeding mechanism and washing equipment within a few steps, you'll cut hours a day from the milking chore.

With the new CLAY milking parlor stalls, easy-to-operate handles control mixing and measuring of feed. You'll feed cows with a flick of your hand.

Three Types of Stalls

Gate-type, Walk-thru, or Herringbone stalls can be used in your new parlor. Each has certain advantages. With the Gate-type, you'll need alleys behind the stalls. In a Walk-thru parlor, the stalls act as an alley. This means a 30% savings in space and a big cut in total building cost.

Some dairymen prefer Gate-type stalls because of occasional slow milkers. Also, they like to give individual attention to certain cows. Personal opinion, amount of space available, number of operators, and handling of cows are important factors to be studied before deciding on type of stalls.

The "Cow-a-Minute" Herringbone

Newest development is the CLAY Herringbone parlor in which a skilled operator can milk *and feed* up to 60 cows an hour. A Herringbone system is generally the best choice for large herd owners.

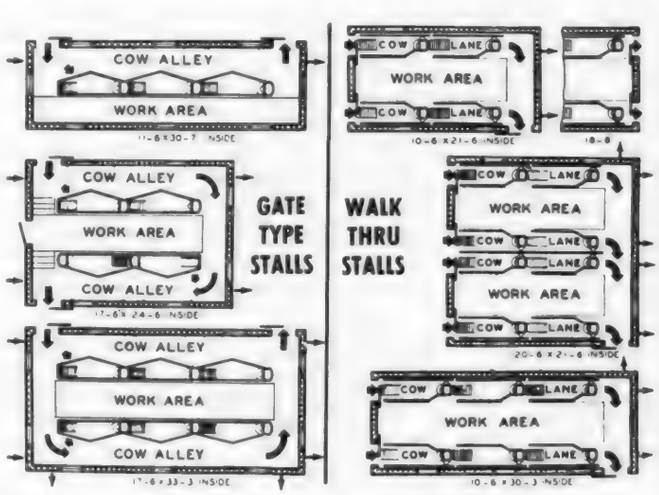
First, 6 cows enter and leave the parlor at one time. *Second*, because of the unique packing arrangement, udders are close together. There are 12 udders alongside a pit only 19 feet in length. *Third*, 6 cows are fed at one time, from one location.

Milking Parlor Bulletin Free

The newest, most up-to-date information on planning milking parlors is contained in a new book by Joe Clay. A copy will be sent to you free on request. Write to: Clay Equipment Corp., 392 Fulton Street, Cedar Falls, Iowa. Free books also available on Silo Unloaders, Mechanical Feeders, Barn Cleaners and Crop Driers. Please specify which of these free books you want.

How Clay Purchase Plan Helps You Build Your Milking Parlor Sooner

It will pay you to investigate Clay's new Purchase Plan. A 20% initial investment is now all you need to buy your Clay Milking Parlor. Write Clay Equipment Corp., 392 Fulton Street, Cedar Falls, Iowa . . . or ask your Clay Dealer.



Two types of stalls—gate type and walk-thru are shown here. Minimum space requirements are shown on sketches. Arrows show entrance and exit of cows. Pick out the plan that most nearly fits your need. Mark this plan with pen or pencil and mail to Clay at address in box above. We will gladly send you standard floor plan and money-saving ideas. This service costs you nothing.

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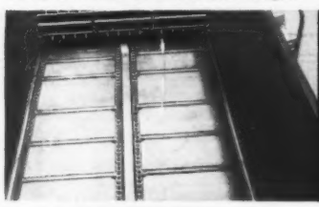
4. Four Main Conveyor Chains — Double Duty — Double Protection.
5. Two Double-Bar Beaters—with adjustable speeds for controlled discharge and sure mix of feed additives.
6. Steel Flights in Cross Conveyor — no slippage of discharge—no belts to wear out. Has longer chain life.
7. Roller Chain Drives on Beaters and Cross Conveyor — guarded for safety — selected for greatest trouble-free service.
8. Easily Converted to Rear Unloading.

THE COBEY 51 B SELF-UNLOADING FORAGE WAGON—a straight forage wagon easily converted to bunk-feeder wagon.

LOOK AT THIS UNLOADING VOLUME—cross conveyor unloads at either ground or bunk-feeder height.



4 MAIN CONVEYOR CHAINS—are pulled—not pushed—in unloading at either rear or side.

TROUBLE-FREE UNLOADING—Chain drives from discharge end. Pulls instead of pushes. No belts to wear out.

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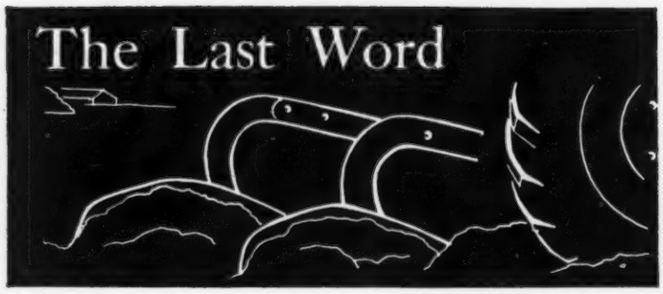


The New Transmission In our Winter issue we predicted, "Transmissions are coming with new convenience. . . . They will . . . have power shift throughout their range of speeds . . . gear changes will be made with a small finger-tip selection lever." Now, one of these transmissions is here and we have driven it. Using the sun-and-planet principle (illustrated in the flip pages of the last issue) the new line of Ford tractors can be shifted on the move to a higher or lower gear ratio. They have also included some refinements such as an "inching control" pedal to permit slow, precision movement; a park position of the gear selector which locks the rear wheels; and three PTO outlets at either 540 or 1,000 rpm.

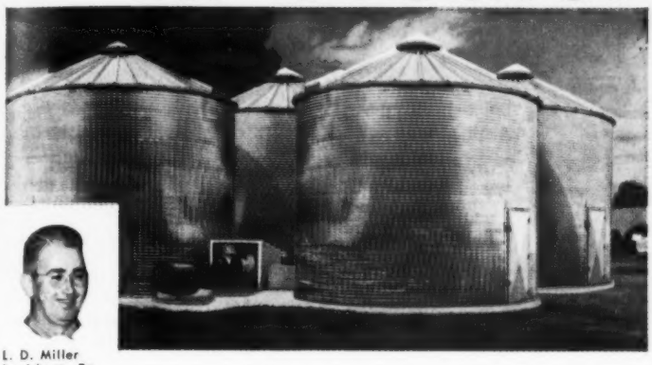
In driving the machine we found shifting gears was as simple as in a new car—just move a handle under the steering wheel. They said we could move the selector to any position regardless of the tractor speed. Being obstinately literal, we chose "park." The wheels locked. The tractor stopped. No damage was done. As a matter of fact, the transmission is most rugged. Ford tells us they have tried to wear one out to find the vulnerable spots. They have failed so far. They still continue to produce the old, standard transmission. The new shift costs $165 more in comparable models.

Dust Unto Dust A new and exciting approach to the insect problem is being developed by a group of entomologists at the University of California. These scientists have found a large number of insects are lethally susceptible to certain chemically harmless dusts which absorb the thin wax coating insects need to retain the vital moisture of their bodies. Among the dusts tested are fuller's earth clays, diatomaceous earths, silica gels, and aerogels. One of the best of these will soon be released under the name Dri-Die 67 and and another, SG 78, is being extensively tested. For farm use, the problem has been to devise efficient methods of application. In tests they have been shown to kill cockroaches, termites, house flies, fowl mites of chickens, fleas, bedbugs, vinegar flies, fruit flies, mosquitoes, dog and buffalo ticks, moths, grasshoppers, crickets, earwigs, greenhouse thrips, spiders, brown snails, sow bugs, and pill bugs. Dri-Die 67 is being used on animals, dogs and cats, to rid them of fleas. Dr. Barry Tarshis, one of the scientists who has developed these new dust insecticides, believes better methods of application for farm use will soon be worked out.

Dusted cockroaches.

Weighing Bulk Feed Lester Meyer, a Stanwood, Iowa, farmer, has perfected a machine for weighing any bulk feed—silage, corn, supplement—as it is taken from the bin or silo. Meyer's device is a fulcrum counter-balanced hopper with two compartments. When one compartment fills with a measured amount of feed, the hopper tips and the other compartment begins to fill. Tipping releases the compartment door allowing the full side to empty. A re-set counter keeps tab on the number of hopperfuls dumped. The device, called the Meyermatic Feed Weigher, is being marketed through Seedburo Equipment Company, 618 W. Jackson Blvd., Chicago 6, Illinois.

These MARTIN*Ideas Pay Off ••In Greater Farm Profits!

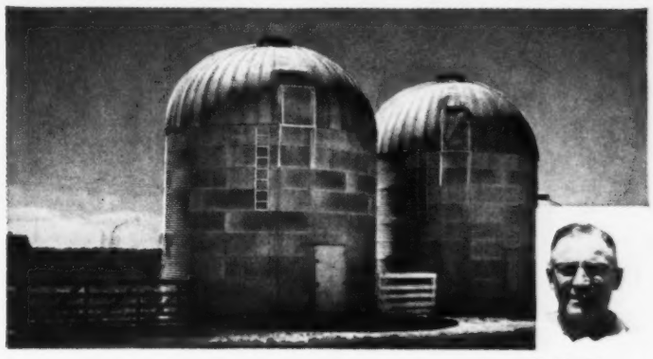


L. D. Miller
Lewisburg, Pa.

Low Cost Drying and Storage

* "The Martin Harvest Hoarder System paid for itself the first year. Now, I'm an independent farmer with either corn or grain."

For less than 3¢ a bushel, Mr. Miller dried his entire wheat crop. Then, he turned off the drying switch and left his wheat stored in the Martin Harvest Hoarder for spring delivery. His income was increased by 58¢ a bushel last year, thanks to his Martin System. Send the handy coupon today, for the "Secret of handling corn or grain."



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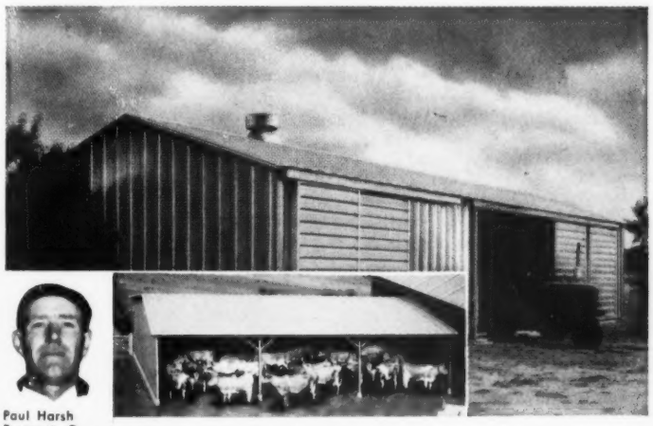
You fill and empty the Martin High Round Crib w[illegible] same elevator. As one farmer put it, "my hands neve[illegible] the crop." The Martin High Round Crib can dry yo[illegible] too — for as little as 2¢ a bushel. Why not send [illegible] complete story today?



Paul Harsh
Prospect, O.

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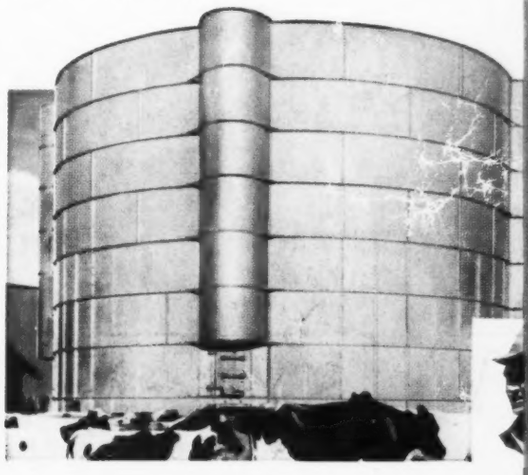
* "All last winter proved to me that the Martin Loafing Shed is the answer to better winter milk production."

Choose the weather-tight protection of a Martin Steel Rigid Frame Building — to increase winter and summer milk production -or- add two to three years to the life of your implements and tractors. Send the coupon today for the complete brochure of plans. See for yourself that any floor layout is possible — there are no posts or beams.



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* "I've used both bunker and trench successfully [illegible] never again. Not when I can feed top grade silage [illegible] storage cost of 70¢ a ton from a Martin Jumbo."

Many modern dairy farmers are finding that there [illegible] better feed than silage. And no cheaper way to ha[illegible] than with a Martin Jumbo. Why not check the coupon [illegible] and find out how the Martin 500-Ton Jumbo can he[illegible] cut feed costs more than you ever thought possible.

W. Skinn
Norwalk, O.

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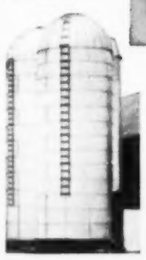

* "I'm using five Martin Silos now. I wish I had more."

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